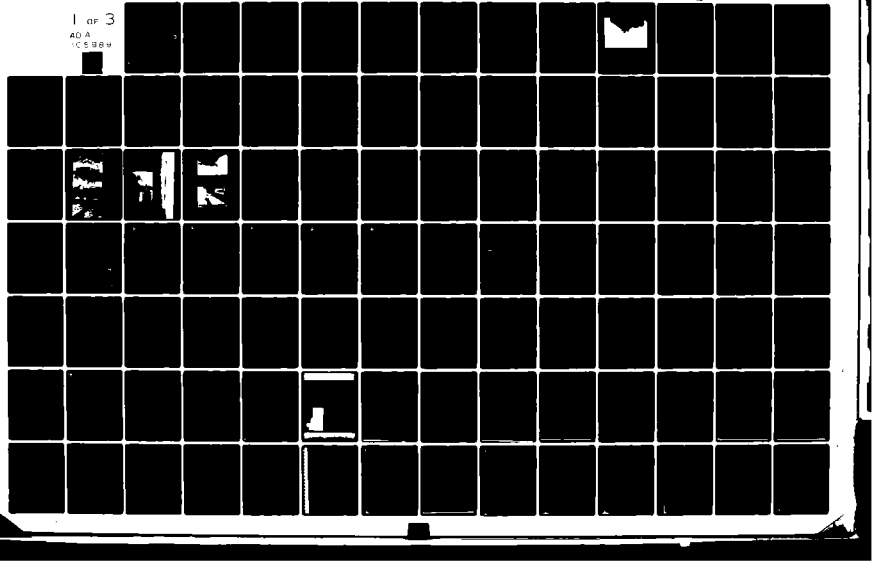
AD-A105 989 STETSON-DALE UTICA NY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. LARKIN CREEK DAM (INVENTORY NUMBER--ETC(U)
JUN 81 J B STETSON DACW51-81-C-0009
UNCLASSIFIED NL



SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A105 989
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle) Phase I Inspection Report Larkin Creek Dam Lake Ontario Basin, Monroe County, N.Y. Inventory No. 711	5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) JOHN B. STETSON	8. CONTRACT OR GRANT NUMBER(s) DACW51-81-C-0009
9. PERFORMING ORGANIZATION NAME AND ADDRESS Stetson-Dale 185 Genesee Street Utica, New York 13501	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Department of the Army 26 Federal Plaza New York District, CofE New York, New York 10287	12. REPORT DATE 30 June 1981
	13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Department of the Army 26 Federal Plaza New York District, CofE New York, NY 10287	15. SECURITY CLASS. (of this report) UNCLASSIFIED
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

LEVEL

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; Distribution unlimited.

DTIC ELECTE OCT 22 1981 D H

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

National Dam Safety Program. Larkin Creek Dam (Inventory Number NY 711). Lake Ontario Basin, Monroe County, New York. Phase I Inspection Report.

Original contains color plates: All DTIC reproductions will be in black and white"

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dam Safety
National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability
Larkin Creek Dam
Monroe County
Lake Ontario Basin

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

The Phase I Inspection of the Larkin Creek Dam did not indicate conditions which would constitute an immediate hazard to human life or property.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

4-25

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

The hydrologic/hydraulic analysis indicates that the spillway is capable of passing the Probable Maximum Flood (PMF) with a foot of freeboard. Therefore, the spillway is assessed as adequate according to the Corps of Engineers' screening criteria.

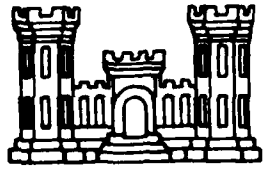
LAKE ONTARIO BASIN

LARKIN CREEK DAM

NEW YORK

INVENTORY No. NY 711

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



NEW YORK DISTRICT CORPS OF ENGINEERS

MAY 1981

DISCLAIMER NOTICE

THIS DOCUMENT IS BEST QUALITY PRACTICABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

TABLE OF CONTENTS

APPENDIX

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Larkin Creek Dam I.D. No. NY 711
State Located:	New York
County:	Monroe
Watershed:	Lake Ontario Basin
Stream:	Larkin Creek
Date of Inspection:	November 20, 1980

ASSESSMENT OF GENERAL CONDITIONS

The Phase I Inspection of the Larkin Creek Dam did not indicate conditions which would constitute an immediate hazard to human life or property.

The hydrologic/hydraulic analysis indicates that the spillway is capable of passing the Probable Maximum Flood (PMF) with a foot of freeboard. Therefore, the spillway is assessed as adequate according to the Corps of Engineers' screening criteria.

The Phase I inspection has identified the need for the following investigation to be undertaken within one year.

1. The analysis of the emergency spillway channel under flood discharges indicates that the depths of flow and velocities associated with flows in excess of the 1/2 PMF may result in erosion of the emergency spillway channel with subsequent erosion of the embankment. An investigation of the effect of flow in the emergency spillway channel should be performed to determine whether the erosive effect of high flows would cause damage to the embankment of the dam. Remedial work should be undertaken depending on the results of this investigation.

The following remedial work should be undertaken within one year:

1. Motor bike traffic should be restricted on the facility. The erosion due to this traffic should be repaired.

2. A flood warning and emergency evacuation system should be implemented to alert the public should conditions occur which could result in failure of the dam.

3. A formalized inspection system should be initiated to develop data on conditions and maintenance operations at the facility, including the slopes and the area immediately downstream from the toe of the embankment. Deficiencies and the remedial measures undertaken to correct these deficiencies should be well documented to provide historical background on which future evaluations may be made.

Dale Engineering Company

John B. Stetson, President

Approved By:
Date:

Col. W. M. Smith, Jr.
New York District Engineer

30 JUN 1981

1. Overview of the dam. Retention basin on the right. Downstream protected area on the left. Control outlet in the background.

PHASE I INSPECTION REPORT
LARKIN CREEK DAM I.D. NO. NY 711
LAKE ONTARIO BASIN
MONROE COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

Authority for this report is provided by the National Dam Inspection Act, Public Law 92-367 of 1972. It has been prepared in accordance with a contract for professional services between Dale Engineering Company and the U.S. Army Corps of Engineers.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the existing condition of the Larkin Creek Dam and appurtenant structures, owned by the Town of Greece, New York, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the U.S. Army Corps of Engineers.

This Phase I inspection report does not relieve an Owner or Operator of a dam of the legal duties, obligations or liabilities associated with the ownership or operation of the dam. In addition, due to the limited scope of services for these Phase I investigations, the investigators had to rely upon the data furnished to them. Therefore, this investigation is limited to visual inspection, review of data prepared by others, and simplified hydrologic, hydraulic and structural stability evaluations where appropriate. The investigators do not assume responsibility for defects or deficiencies in the dam or in the data provided.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Larkin Creek Dam is located in the Town of Greece, west of Elmgrove Road and south of St. Andrews Drive just northwest of the Hamlet of South Greece. The dam is an earth fill structure approximately 2,100 feet long with a maximum height of approximately 12-1/2 feet. The structure is "L" shaped with the short leg facing in a north-south direction to conform to the residential subdivision development in the area. The discharge control structure for this stormwater detention facility consists of a 36 inch diameter concrete pipe outlet with a 36 inch square sluice gate which is used to regulate the outflow from the impoundment during runoff events. The regulating structure is located near the center of the facility. The emergency spillway is located at the extreme easterly end of the structure and consists of a broad crested weir 275 feet long discharging into a grassed channel with riprap protected banks. A concrete sill 5 feet deep and 2 feet wide at the crest of the emergency spillway prevents erosion at this point. The embankment at the junction with the spillway section is protected by a section of riprap. The discharge channel from the emergency spillway runs parallel to the earth fill embankment to the receiving stream.

b. Location

The Larkin Creek Dam is located in the Town of Greece, Monroe County, New York.

c. Size Classification

The maximum height of the dam is approximately 12 feet. The volume of the impoundment is approximately 212 acre feet to the top of dam. Therefore, the dam is in the small size classification as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

The east branch of Larkin Creek, the receiving stream from the impoundment, flows through a heavily developed residential area of the Town of Greece. Several residences are located in close proximity to the structure. Therefore, the dam is in the high hazard category as defined by the Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the Town of Greece, New York.

Contact: James S. Peet, P.E.
Town Engineer
Greece Town Hall
2505 West Ridge Road
Rochester, New York 14626
Telephone: (716) 225-2000

f. Purpose of the Dam

The dam is used as a storm water retention facility to control flows in the east branch of Larkin Creek downstream from the facility.

g. Design and Construction History

The plans included in this report indicate that the dam was designed in 1976 with construction completed in 1977. The dam, as it presently exists, substantially conforms to the plans. No modifications have been made to the facility since its construction.

h. Normal Operational Procedures

The facility is operated by the Town of Greece. Flow is maintained through the outlet control structure during dry weather flow. The facility is monitored twice weekly during these periods. During runoff events, the sluice gate controlling the outlet flow is manipulated to control flow in the receiving stream downstream from the facility. During these runoff events, the facility is monitored every 2 hours or more often if required. Adjustments to the outlet flow are made on an around-the-clock basis until the runoff event is terminated and the impoundment is drained.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of the Larkin Creek Dam is 0.96 square miles (617 acres).

b. Discharge at Dam Site

Maximum recorded reservoir elevation is 453.35, which was accompanied by a discharge of approximately 17 cfs.

Computed Discharges:

Emergency Spillway, top of dam	4,230	cfs
* Gated Drawdown	120	cfs

c. Elevation (feet above MSL)

Top of Dam	459.0
Spillway crest	455.75
Stream bed at centerline of dam	446.5
Invert of 36 inch Pipe	446.6

d. Reservoir

Length of maximum pool	2,400+ ft. (1/2 PMF)
Length of normal pool	Normally dry

e. Storage

Top of Dam	212	acre feet
Spillway Crest	82	acre feet

f. Reservoir Area

Top of Dam	53	acres
Spillway Crest	26	acres

g. Dam

Type - Earth fill
Length - 2,100
Height - 12.5 feet
Freeboard Between Spillway Crest and Top of Dam - 3.25 feet
Top Width - 10 feet
Side Slopes - 3 horizontal:1 vertical, upstream and downstream
Zoning - Homogeneous
Impervious Core - None
Grout Curtain - None

* Discharge through 36 inch diameter pipe with gate fully open and the reservoir at top of dam.

h. Spillway (emergency)

Type - Broad crested weir
Length - 275+ feet
Crest Elevation - 455.75
Gates - none
U/S Channel - Impoundment
D/S Channel - Grassed slope, riprapped banks, concrete sill 5 feet deep, 2 feet wide at crest.

i. Regulating Outlets

36 inch concrete pipe outlet with 36 inch square sluice gate control.

SECTION 2: ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. Geology

Geologically, Larkin Creek Dam is located in the Eastern Lake section of the Central Lowland Province which is part of the Interior Plains, the major physiographic division. The dam is sited on glacial debris which overlies horizontal beds of either the Grimsby Sandstone of Lower Silurian age, the Queenston Shale of Upper Ordovician age, or is on the contact between the two formations, Grimsby to the south and Queenston to the north of the dam. The Grimsby is made up mostly of thick-bedded red siltstone and includes thin-bedded argillaceous shales, particularly near its base. The underlying Queenston is made up predominantly of thin-bedded, red argillaceous shale and includes beds of siltstone and sandstone, particularly near its top. Thus, without petrographic and grain-size analysis, it is difficult to differentiate between the two formations near their contact. Bedrock is generally within 15 feet of the surface.

The glacial debris was located at the then southern boundary of glacial Lake Iroquois. The debris appears to be mainly of a glacial lake beach which consists of silt, sand, and gravel layers and lenses. Silty sand and sandy silt are most common. A zone or layer of glacial till may be present between the bedrock below and the beach deposits above. On occasion it appears on the surface due to the probable irregularity of its thickness and may represent a covered ground moraine. The beach type covering could be wave reworked moraine.

Glacial till is an unsorted and unstratified deposit. The soil profile along the dam centerline, as shown in Figure 2 in the report by J. P. Collins (See Appendix E), is not suggestive of a till but rather beach and lacustrine deposits along with some till.

Several soil varieties are present in the vicinity of the dam. Permeability varies from moderately rapid to rapid, from 0.63 to more than 6.3 inches per hour, depending upon the soil type.

b. Subsurface Investigations

Detailed subsurface investigations were conducted prior to the design of the facility. The records of these subsurface investigations are included in Appendix E.

2.2 DESIGN RECORDS

The preliminary engineering report and design computations for the construction for the design of this facility are included in Appendix E.

2.3 CONSTRUCTION RECORDS

Although the records kept during construction were not available for review, the design engineer's certification of construction indicates that the facility was constructed under his inspection and that of his soils consultant. A letter summarizing the construction of the facility is included in Appendix E.

2.4 OPERATION RECORDS

The facility is monitored twice weekly during dry weather periods. An inspection check list (See Appendix E) is filled out during each inspection trip. The check list covers security measures at the site and documents the position of the control gate. During runoff events, the facility is monitored every 2 hours or more often if required. Elevations of the water in the impoundment are recorded on a storage curve during each visit. Control gate positions are also documented. Outlet gates are adjusted to maintain optimum flow in the downstream channel.

2.5 EVALUATION OF DATA

The data presented in this report was obtained from the Town Engineer of the Town of Greece and from the files of the New York State Department of Environmental Conservation, Dam Safety Section. The information appears to be reliable and adequate for a Phase I Inspection Report.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

The Larkin Creek Dam was inspected on November 20, 1980. The Dale Engineering Company Inspection Team was accompanied on the inspection by James S. Peet, P.E., Town Engineer of the Town of Greece. At the time of the inspection, a light snow cover partially obscured the ground surface in the area. The weather was fair and sunny and the temperature was in the mid 30's. At the time of the inspection, there was no water in the impoundment. The control gate at the outlet structure was open approximately 8 inches. The flow through the outlet structure was not restricted by the control gate.

b. Dam

The embankment of the facility shows no signs of subsidence, misalignment, or sloughing of the slopes. Since the facility is a stormwater detention basin and no water was impounded at the time of the inspection, there was no evidence in the field of seepage at the toe or on the downstream slope of the embankment. Minor erosion on the slope of the embankment and the sod surface of the spillway channel was detected. This erosion was attributed to motor bike traffic on the facility.

c. Control Outlet

The outlet control structure was in good condition and the control gate was in operating condition and well maintained.

d. Emergency Spillway

The sod surface of the emergency spillway was in good condition although minor erosion from dirtbike traffic was noted downstream in the spillway channel. The remainder of the channel was uniform in cross section with a well established sod cover. The riprapped banks of the emergency spillway channel are in good condition.

e. Reservoir Area

The reservoir area, at the spillway elevation, extends approximately 2,000 feet upstream from the dam structure. The area in the impoundment remains in a natural state with light woods and brush prevailing throughout the area. Slopes at the edge of the impoundment at the maximum pool elevation area are gently sloping and no erosion was noted in the reservoir area.

f. Downstream Channel

The channel downstream from the control outlet is formed in sand and gravel. The channel is severely restricted by a 38 inch by 24 inch elliptical roadway culvert through Andrews Drive located just downstream from the impoundment.

3.2 EVALUATION

The visual inspection revealed that the dam is generally in good condition with only minor erosion due to motor bike traffic in the emergency spillway channel and on the slopes of the embankment. Both the control outlet and the emergency spillway are in good condition and no signs of structural instability were detected.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The normal operating procedure for this facility is to control the flow in the downstream channel of Larkin Creek to prevent flooding of residential properties during rainfall runoff events. During dry weather the sluice gate at the control outlet is maintained in a position which will allow unrestricted flow through the facility. The position of the gate at the time of the inspection provided an opening of approximately 8 inches. During rainfall events, the gate in this position would begin to impede flow and thereby raise the water level in the impoundment. As runoff continues, the facility is monitored every 2 hours or more often if necessary depending on the extent of runoff. The gate is adjusted to maintain optimum flow in the downstream channel. Around-the-clock surveillance is maintained during runoff events.

4.2 MAINTENANCE OF THE DAM

Maintenance and operation of the dam is controlled by the Town of Greece. Periodic visits are made to the site to check on the conditions of the facilities. An inspection checklist is completed based on the findings of the monitoring visit.

4.3 MAINTENANCE OF OPERATING FACILITY

The gate controlling the outlet from the impoundment is in good condition and properly maintained.

4.4 DESCRIPTION OF WARNING SYSTEM

No warning system is in effect at present.

4.5 EVALUATION

The dam and appurtenances are regularly inspected by representatives of the Town of Greece. The facility is presently in good condition. There is no evidence of deterioration caused by lack of maintenance. Since the dam is in the high hazard classification, a warning system should be implemented to alert the public should conditions occur which could result in failure of the dam.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The Larkin Creek Dam is a flood control structure located in the southwestern portion of the Town of Greece, just south of St. Andrews Drive and some 4,400 feet north of the Erie Canal. The dam has a drainage area of 0.96 square miles which is characterized by moderately sloping pastured and wooded terrain. The drainage area is bounded on the south by the canal and the southwestern portion extends into the Town of Ogden. The reservoir has a surface area of approximately 26 acres at the spillway crest. However, due to the operation of the facility as a flood control structure, the reservoir area is normally dry.

5.2 ANALYSIS CRITERIA

The purpose of this investigation is to evaluate the dam and spillway with respect to their flood control potential and adequacy. This has been assessed through the evaluation of the Probable Maximum Flood (PMF) for the watershed and the subsequent routing of the flood through the reservoir and the dam's spillway system. The PMF event is that hypothetical flow induced by the most critical combination of precipitation, minimum infiltration loss and concentration of run-off of a specific location that is considered reasonably possible for a particular drainage area.

The hydrologic analysis was performed using the unit hydrograph method to develop the flood hydrograph. Due to the limited scope of this Phase I investigation, certain assumptions, based on experience and existing data were used in this analysis and in the determination of the dam's spillway capacity to pass the PMF. In the event that the dam could not pass 1/2 the Probable Maximum Flood without overtopping, additional analyses are to be performed on potential dam failures if the dam is designated as a High Hazard Classification. This process was done with the concept that if the dam was unable to satisfy this criteria, further refined hydrologic investigations would be required.

The U.S. Army Corps of Engineers' Hydrologic Engineering Center's Computer Program HEC-1 DB using the Modified Puls Method of flood routing was used to evaluate the dam, spillway capacity, and downstream hazard.

Unit hydrographs were defined by Snyder coefficients, C_t and C_p. Snyder's C_t was estimated to be 2.0 for the drainage area and C_p was estimated to be 0.625. In this analysis, the reservoir pool was assumed to be at the spillway crest elevation at the start of the storm and outflow through the low level outlet was assumed to be zero.

The Probable Maximum Precipitation (PMP) was 21.6 inches according to Hydrometeorological Report (HMR #33) for a 24-hour duration storm, 200 square mile basin, while loss rates were set at 1.0 inches initial abstraction and 0.1 inches/hour continuous loss rate. The loss rate function yielded 87 percent run-off from the PMF. The peak for the PMF inflow

hydrograph was 2,358 cfs and the 1/2 PMF inflow peak was 1,179 cfs. The storage capacity of the reservoir above the spillway crest only reduced these peak flows to 2,316 cfs for the PMF and 1,134 cfs for the 1/2 PMF flow.

5.3 SPILLWAY CAPACITY

Under normal operation, flood flows are released from the reservoir by controlling the gate opening for the 36 inch diameter low level outlet. If flood flows surpass the control capability provided by the low level outlet and reservoir storage, then excess flows are passed by the emergency spillway. Due to the operator regulation required and the potential for malfunction in the system, the reservoir pool was assumed to be at the spillway crest at the start of the storm, and outflow through the low level outlet was assumed to be zero for this analysis.

The emergency spillway is trapezoidal in section with a 275 foot bottom width and 3:1 side slopes. The control section is formed by a concrete section that is covered with topsoil and grassed. Both upstream and downstream faces are grassed and inclined at shallow slopes from the horizontal. The discharge capacity of the emergency spillway at the top of dam elevation is 4,228 cfs.

EMERGENCY SPILLWAY CAPACITY

Flood	Peak Discharge	Capacity as % of Flood Discharge
PMF	2,316 cfs	183%
1/2 PMF	1,134 cfs	373%

The low level outlet has the capability of adding another 120 cfs to the total discharge capacity of the structure with its gate fully opened and the reservoir level at the top of dam.

The emergency spillway channel runs along the toe of the embankment and tapers from a width of 275 feet at the spillway crest to about 30 feet at its nearly 90 degree confluence with the receiving stream just beyond the toe of slope. Due to this configuration and proximity to the embankment, the emergency spillway channel was investigated to determine its adequacy under flood discharges. This analysis indicates that in the lower (narrow) reach of the channel, the depth of flow will rise above the two feet height of riprap for the 1/2 PMF and larger discharges. Accompanying velocities for these flows could be in the range of 10 feet per second. This condition could lead to erosion of the embankment.

5.4 RESERVOIR CAPACITY

The reservoir storage capacity was obtained from "Preliminary Engineering Report - Larkin Creek Watershed, Retention Basin Number One" (Ref. 20) and USGS mapping. The resulting estimates of the reservoir storage capacity are shown below:

Top of Dam	212 Acre Feet
Emergency Spillway Crest	82 Acre Feet

5.5 FLOODS OF RECORD

The maximum recorded reservoir elevation was 453.35 and occurred on February 21, 1981. The discharge associated with this reservoir elevation was approximately 17 cfs.

5.6 OVERTOPPING POTENTIAL

The HEC-1 DB analysis indicates that the spillway can pass the PMF with 1.0 feet of freeboard and the 1/2 PMF with 1.75 feet of freeboard.

5.7 EVALUATION

The hydrologic/hydraulic analysis indicates that the spillway is capable of passing the Probable Maximum Flood (PMF) with a foot of freeboard. Therefore, the spillway is assessed as adequate according to the Corps of Engineers' screening criteria.

The investigation of the emergency spillway channel under flood discharges indicates that the depth of flow in the lower (narrow) reach of channel will rise above the riprap for the 1/2 PMF and larger discharges. The accompanying velocities for these flows will be in the range of 10 feet per second, which could lead to erosion of the embankment. Due to this erosion potential, further investigations should be undertaken to analyze the effect of flow through the emergency spillway channel on the stability of the spillway channel and dam embankment.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

The Larkin Creek Dam is a flood retention facility consisting of an earthen embankment and spillway section. The spillway section comprises the easterly most section of the dam and ties into the right earthen abutment. The earthen embankment portion of the dam extends from the left side of the spillway section some 1,460 feet in a westerly direction and then 650 feet in a northerly direction to the left abutment where it ties into natural ground.

The slopes of the earthen embankment are grassed and an access road runs along the entire crest of the embankment. The embankment is well maintained, adequately mowed, and void of any brush or tree growth. The slopes are generally uniform with no evidence of structural movement or cracking. The crest and some areas of the slope of the embankment have been subjected to motor bike travel. This has led to some localized surface erosion of the slopes.

The emergency spillway, according to the plans, consists of a 2 feet wide concrete control section that is covered with topsoil and grassed. The bottom of the emergency spillway channel is grassed, whereas the side slopes are riprapped to a height of approximately 2 feet above the channel bottom. The spillway channel extends from the right abutment, along the toe of the embankment, to its junction with the receiving stream which normally flows through the low level outlet. This channel, which is some 275 feet wide at the spillway crest, tapers down to 20 to 30 feet at its confluence with the receiving stream. The spillway channel flows into the receiving stream at a nearly 90 degree angle to the axis of the outlet channel. Due to the undesirable hydraulic characteristics of this junction and the tapered spillway channel, floodwaters discharging through the emergency spillway channel may very well flow past the outlet channel and/or rise above the channel riprap. Velocities in the spillway channel would approach 10 feet per second and could result in erosion of the channel invert, displacement of the bank protection and eventually cause damage to the downstream face of the embankment. In either of these situations, contact of the flood flows with the unprotected embankment could lead to erosion of the downstream slope with a resulting decrease in stability.

b. Design and Construction Data

No information regarding the slope stability of the structure was located. Drawings included in Appendix F substantially conform to the present facility. The drawings indicate the embankment was specified to be a homogeneous earth fill dam, compacted to 90% of modified proctor maximum density. The embankment crest was specified as 10 feet wide and the side slopes as 3:1 (horizontal to vertical), both upstream and downstream. The emergency spillway was to be constructed in natural ground. A 2 feet wide concrete sill serves as the control section running the entire crest

length. This concrete sill is covered with sod. The spillway channel is trapezoidal with 3:1 side slopes and a bottom width that varies from 275 feet at the spillway crest to about 30 feet at its junction with the outlet channel.

Construction drawings for the project are dated April 1976 and available correspondence indicates the project was completed in 1977.

c. Operating Records

The only formal operating records pertain to pool elevations, gate openings of the low level outlet, and security measures.

d. Post Construction Changes

There is no field evidence or available information indicating post construction changes to the facility.

e. Seismic Stability

No known faults or lineaments suggesting faults are present in the immediate area. The area is located within Zone 2 of the Seismic Probability Map but is only 25 miles northeast of an active Zone 3 which has had earthquakes with intensities as great as VIII on the Modified Mercalli Scale. Only a few earthquakes have been recorded in the vicinity of the reservoir and are tabulated below:

Date	Intensity Modified Mercalli	Location Relative to Dam
1931	I	8 miles E
1931	II	8 miles E
1944	II	8 miles SE
1977	IV	19 miles SE

6.2 STRUCTURAL STABILITY ANALYSIS

The earthen embankment appeared to be generally uniform in section with no signs of structural instability in evidence. The emergency spillway channel extends along the toe of the embankment from the spillway crest to its nearly 90 degree junction with the outlet channel. At the confluence with the outlet channel the spillway channel tapers to a bottom width of about 20 to 30 feet. The emergency spillway channel and outlet channel may be inadequate to safely convey flood discharges on the order of magnitude of the 1/2 PMF safely beyond the dam. This condition should be investigated further to determine if flood flows discharging from the emergency spillway channel constitute a potential hazard to the structural integrity of the embankment. The appropriate measures necessary to remedy this problem should be undertaken if the structural integrity is threatened.

The entire embankment, as well as areas beyond the toe of the slope, should be regularly inspected as a part of a formalized inspection program to detect deficiencies. Any deficiencies and the remedial measures undertaken to correct these deficiencies should be well documented to provide historical background on which future evaluations may be based.

SECTION 7: ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety

The Phase I Inspection of the Larkin Creek Dam did not indicate conditions which would constitute an immediate hazard to human life or property.

The hydrologic/hydraulic analysis indicates that the spillway will pass 183% of the Probable Maximum Flood (PMF). Therefore, the spillway capacity is assessed as adequate.

The visual inspection did not reveal conditions which would indicate evidence of structural displacement or instability.

The following specific safety assessments are based on the Phase I visual examination and analysis of hydrology and hydraulics, and structural stability:

1. The spillway channel flows into the receiving stream at a nearly 90° angle to the axis of the outlet channel. The tapered configuration of the emergency spillway channel would cause high flow velocities during spillway discharge which could result in erosion of the spillway channel, displacement of the bank protection and eventually erosion of the downstream slope of the embankment with a resulting decrease in stability.

2. Minor surface erosion due to motor bike traffic was detected on the slopes of the embankment and in the channel of the emergency spillway.

3. No warning system is presently in effect to alert the public should conditions occur which could result in failure of the dam.

4. Although the facility is inspected regularly, the inspection program does not include a formalized inspection of the entire embankment and areas beyond the toe of slope.

b. Adequacy of Information

The information available is adequate for this Phase I investigation.

c. Urgency

Items 1 through 4 of the safety assessment should be addressed by the Owner and appropriate actions taken within one year of this notification.

d. Need for Additional Investigation

Further investigation should be undertaken to analyze the effect of flow through the emergency spillway on the stability of the spillway channel and embankment downstream from the emergency spillway crest.

7.2 RECOMMENDED MEASURES

The following is a list of recommended measures to be undertaken to insure safety of the facility:

1. An investigation of the effect of flow in the emergency spillway channel should be performed to determine whether the erosive effect of the high flows would cause damage to the embankment of the dam. Remedial work should be undertaken depending on the results of this investigation.

2. Motor bike traffic should be restricted on the facility. The erosion due to this traffic should be repaired.

3. A flood warning and emergency evacuation system should be implemented to alert the public should conditions occur which could result in failure of the dam.

4. A formalized inspection system should be initiated to develop data on conditions and maintenance operations at the facility including the slopes and the area immediately downstream from the toe of the embankment. Deficiencies and the remedial measures undertaken to correct these deficiencies should be well documented to provide historical background on which future evaluations may be made.

APPENDIX A

PHOTOGRAPHS

2. Trash rack at inlet to control outlet. Note gate operator at top of photo.

3. Inlet to control outlet. Note staff gage at left of stream.

4. Outlet of control outlet.

5. Outlet stream showing downstream hazard.

6. Emergency spillway as viewed from downstream. Note slope protection in light brush to left.

7. View down emergency spillway channel. Note slope protection left and right. Channel terminates at outlet stream at right foreground of Photo #5.

8. Outlet channel on downstream side of first downstream road crossing. Note gabions on right bank.

APPENDIX B

VISUAL INSPECTION CHECKLIST

93-15-3(9/80)

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam LARKIN CREEK DAM

Fed. I.D. # NY 711 DEC Dam No. 40A-4227

River Basin LAKE ONTARIO

Location: Town GREECE County MONROE

Stream Name LARKIN CREEK

Tributary of BUCK POND

Latitude (N) 43-12.1 Longitude (W) 77-44.4

Type of Dam EARTH

Hazard Category HIGH

Date(s) of Inspection NOV. 20, 1980

Weather Conditions FAIR (LIGHT SNOW COVER)

Reservoir Level at Time of Inspection NO WATER IMPOUNDED AT TIME OF INSPECTION

b. Inspection Personnel F.W. BUSZEWSKI, B. COLWELL, J.A. GOMEZ H. MUSKATT, - DALE ENGINEERING COMPANY JAMES PEET - TOWN OF GREECE

c. Persons Contacted (Including Address & Phone No.)

JAMES PEET P.E. TOWN ENGINEER

GREECE TOWN HALL TELEPHONE 716-225-2000

2505 W. RIDGE RD.

ROCHESTER, N.Y. 14626

d. History:

Date Constructed 1977 Date(s) Reconstructed ———

Designer WILLIAM C. LARSEN P.E.

Constructed By

Owner TOWN OF GREECE

2) Embankment

a. Characteristics

(1) Embankment Material GLACIAL TILL - SANDY SILT — SILTY SAND

(2) Cutoff Type NONE

(3) Impervious Core NONE

(4) Internal Drainage System NONE

(5) Miscellaneous N/A

b. Crest

(1) Vertical Alignment NO MISALIGNMENT OBSERVED

(2) Horizontal Alignment NO MISALIGNMENT OBSERVED

(3) Surface Cracks NONE OBSERVED (LIGHT SNOW COVER AT TIME OF INSPECTION)

(4) Miscellaneous MINOR EROSION DUE TO MOTOR BIKE TRAFFIC

c. Upstream Slope

(1) Slope (Estimate) (V:H) 1:3

(2) Undesirable Growth or Debris, Animal Burrows NONE OBSERVED

(3) Sloughing, Subsidence or Depressions NONE OBSERVED

(4) Slope Protection WELL ESTABLISHED SOD

(5) Surface Cracks or Movement at Toe NONE OBSERVED.

d. Downstream Slope

(1) Slope (Estimate - V:H) 1 : 3

(2) Undesirable Growth or Debris, Animal Burrows NONE OBSERVED

(3) Sloughing, Subsidence or Depressions NONE OBSERVED
MINOR EROSION FROM MOTOR BIKE TRAFFIC.

(4) Surface Cracks or Movement at Toe NONE OBSERVED

(5) Seepage NONE OBSERVED - NO WATER WAS IMPOUNDED AT THE TIME OF THE INSPECTION.

(6) External Drainage System (Ditches, Trenches; Blanket) DITCH ALONG TOE OF SLOPE TO CARRY LOCAL DRAINAGE - GOOD CONDITION NO SLOUGHING

(7) Condition Around Outlet Structure RIP RAP COMPOSED OF STONE FILL AT OUTLET - SOME DISPLACEMENT OF STONES BY VANDALS.

(8) Seepage Beyond Toe NONE OBSERVED. - NO WATER WAS IMPOUNDED AT THE TIME OF THE INSPECTION.

e. Abutments - Embankment Contact

NO PROBLEMS OBSERVED

(1) Erosion at Contact NONE OBSERVED

(2) Seepage Along Contact NONE OBSERVED. - NO WATER IMPOUNDED AT TIME OF

3) Drainage System

a. Description of System NONE -

b. Condition of System —

c. Discharge from Drainage System —

4) Instrumentation (Momumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.) NONE .

5) Reservoir

a. Slopes THE SLOPES ARE VERY FLAT - IMPOUNDMENT AREA IS NORMALLY DRY.

b. Sedimentation NEGLIGIBLE

c. Unusual Conditions Which Affect Dam NONE

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) HEAVILY DEVELOPED RESIDENTIAL SUBDIVISION, SEE PHOTOS.

b. Seepage, Unusual Growth NONE OBSERVED

c. Evidence of Movement Beyond Toe of Dam NONE OBSERVED

d. Condition of Downstream Channel RESTRICTED BY SMALL ROADWAY CULVERTS.

7) Spillway(s) (Including Discharge Conveyance Channel)

DRY WEATHER FLOW PASSES THROUGH 36" PIPE WITH 36" SQUARE SLUICE GATE TO CONTROL FLOW.

a. General GATE WAS OPEN APPROX 8 inches AT TIME OF THE INSPECTION

b. Condition of Service Spillway GOOD CONDITION - (RECENT CONSTRUCTION 1977) CONTROL GATE IN GOOD CONDITION

c. Condition of Auxiliary Spillway GOOD CONDITION - NO EROSION OBSERVED. SOME MINOR DAMAGE TO SOD COVER DUE TO MOTOR BIKE TRAFFIC. (LIGHT SNOW COVER AT TIME OF INSPECTION) BROAD CRESTED WEIR - SIDE SLOPES RIPRAPPED. 278ft WIDE 5ft deep x 2 ft wide concrete SECTION at CREST.

d. Condition of Discharge Conveyance Channel FLOW CHANNEL IS RESTRICTED BY SMALL CULVERTS DOWN STREAM. CHANNEL FROM CREST OF SPILLWAY TO OUTLET STREAM GOOD CONDITION, WELL MAINTAINED - FLOW THROUGH AUXILLIARY CHANNEL HAS NEVER OCCUR.

8) Reservoir Drain/Outlet

Type: Pipe 36" Conduit _____ Other _____

Material: Concrete ✓ Metal _____ Other _____

Size: 36" Length _____

Invert Elevations: Entrance 446.63 Exit 446.35

Physical Condition (Describe): Unobservable _____

Material: CONCRETE IN GOOD CONDITION

Joints: NOT OBSERVED Alignment GOOD

Structural Integrity: NO EVIDENCE OF STRUCTURAL PROBLEMS OBSERVED IN THE FIELD.

Hydraulic Capability: 36" INLET CONTROL SEE HYDROLOGY AND HYDRAULICS

Means of Control: Gate ✓ 36"x36" Valve _____ Uncontrolled _____

Operation: Operable ✓ Inoperable _____ Other _____

Present Condition (Describe): EXCELLENT - IN GOOD OPERATING CONDITION - WELL MAINTAINED.

9) Structural

a. Concrete Surfaces NO PROBLEMS NOTED - NO SPALLING OR CRACKING (OUTLET STRUCTURE)

b. Structural Cracking NONE OBSERVED (OUTLET STRUCTURE)

c. Movement - Horizontal & Vertical Alignment (Settlement) NONE OBSERVED (OUTLET STRUCTURE)

d. Junctions with Abutments or Embankments N/A

e. Drains - Foundation, Joint, Face N/A

f. Water Passages, Conduits, Sluices N/A

g. Seepage or Leakage N/A.

h. Joints - Construction, etc. N/A

i. Foundation N/A

j. Abutments N/A

k. Control Gates N/A

l. Approach & ~~Outlet~~ Channels SEE PHOTOS - FREE FLOWING NO PROBLEMS.

m. Energy Dissipators (Plunge Pool, etc.) N/A

n. Intake Structures TRASH RACK CLEAR, NO OBSTRUCTIONS SEE PHOTO

o. Stability —

p. Miscellaneous —

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)

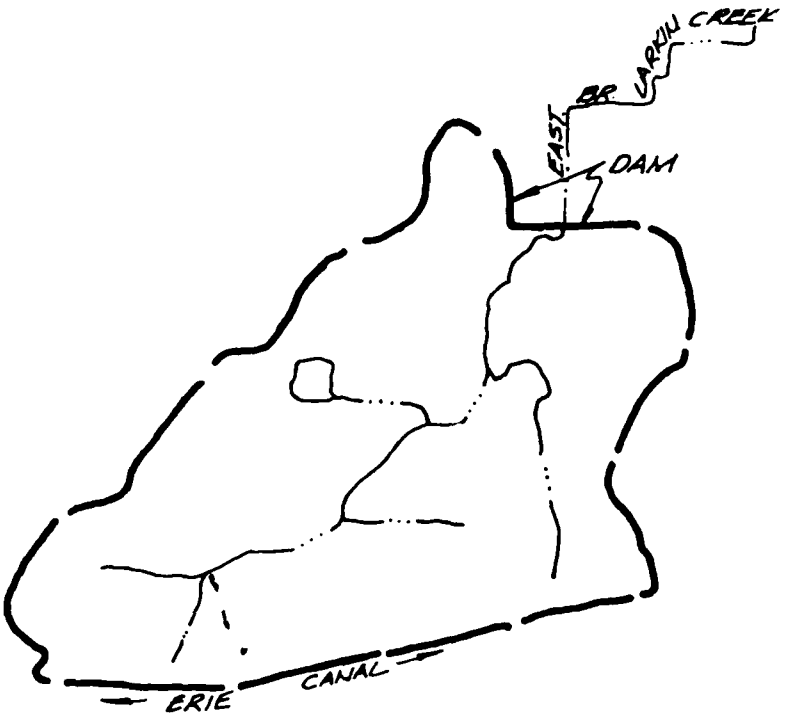
a. Description and Condition NONE

11) Operation Procedures (Lake Level Regulation):

THE FACILITY IS MONITORED TWICE WEEKLY DURING DRY WEATHER. DURING RAINFALL EVENTS THE FACILITY IS MONITORED EVERY TWO HOURS OR, IF REQUIRED, EVERY HOUR. OUTLET GATES ARE ADJUSTED TO MAINTAIN OPTIMUM FLOW DOWN STREAM AT GAGES IN THE RECIEVING STREAM

APPENDIX C

HYDROLOGIC/HYDRAULIC, ENGINEERING DATA AND COMPUTATIONS



SCALE: 1" = 2000'

LEGEND

WATERSHED AREA

SUB AREA

DRAINAGE BASIN

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501
TEL 315•797•5800

DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections 1981 DATE 1-28-81

SUBJECT Larkin Creek Dam PROJECT NO. 252c

Hydrologic Parameters DRAWN BY JAC

Drainage Area = 0.96 mi^2

$L = 8500' = 1.61$ mi

$L_{CA} = 4000' = 0.76$ mi

$C_t = 2.0$ (Assumed)

$t_1 = C_t (L \times L_{CA})^{0.3}$

$t_1 = 2.12$ hr.

$C_p = 0.625$ (Assumed)

Reservoir area ~ 26 acres @ spillway crest

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501
TEL 315-797-5800

DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections 1981 DATE 12-19-80

SUBJECT Larkin Creek Dam, ID # 711 PROJECT NO. 2520

Depth-Area-Duration DRAWN BY JAG

PMP from HMR # 33
for Lat. ~ 43°12' Long. ~ 77°44'
Index Rainfall = 21.6" for 200 mi², 24 hr.
Zone 2

Duration	% Index*	Depth
6 hrs.	117	25.3"
12 hrs.	127	27.4
24 hrs	141	30.5
48 hrs	151	32.6

* Adjusted for site area, Drainage Area = 0.96 mi² (which is less than the lower limit of the areal adjustment graph, 10 mi², therefore these values were adjusted for this lower limit)

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501
TEL 315-797-5800

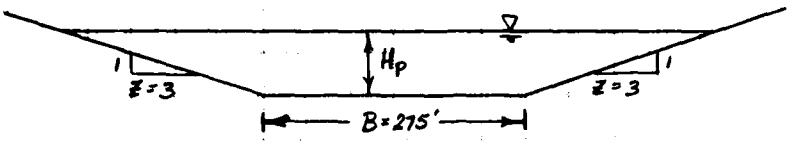
DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections 1981 DATE 1-28-81

SUBJECT Larkin Creek Dam PROJECT NO. 2510

Spillway Rating Curve DRAWN BY JAG

Trapezoidal Spillway
275' bottom width
3:1 Side Slopes
Spillway Crest @ 456
Top of Dam @ Elev. 459



Ref.: "Design of Low Dams"

$$Q = 8.03\, C\, h_v^{1/2} (H_p - h_v)[B + Z(H_p - h_v)]$$

where $$h_v = \frac{3(2Z H_p + B) - (16Z^2 H_p^2 + 16Z B H_p + 9B^2)^{1/2}}{10Z}$$

$C = 0.95$, $Z = 3$

Elevation	H_p (ft.)	Q (cfs)
456	0	0
456.25	0.25	101
456.5	0.5	287
456.75	0.75	527
457	1.0	814
457.25	1.25	1139
457.5	1.5	1500
457.75	1.75	1894
458	2.0	2318
458.5	2.5	3251
459	3	4288
459.5	3.5	5423
460	4	6650
460.5	4.5	7963
461	5	9360

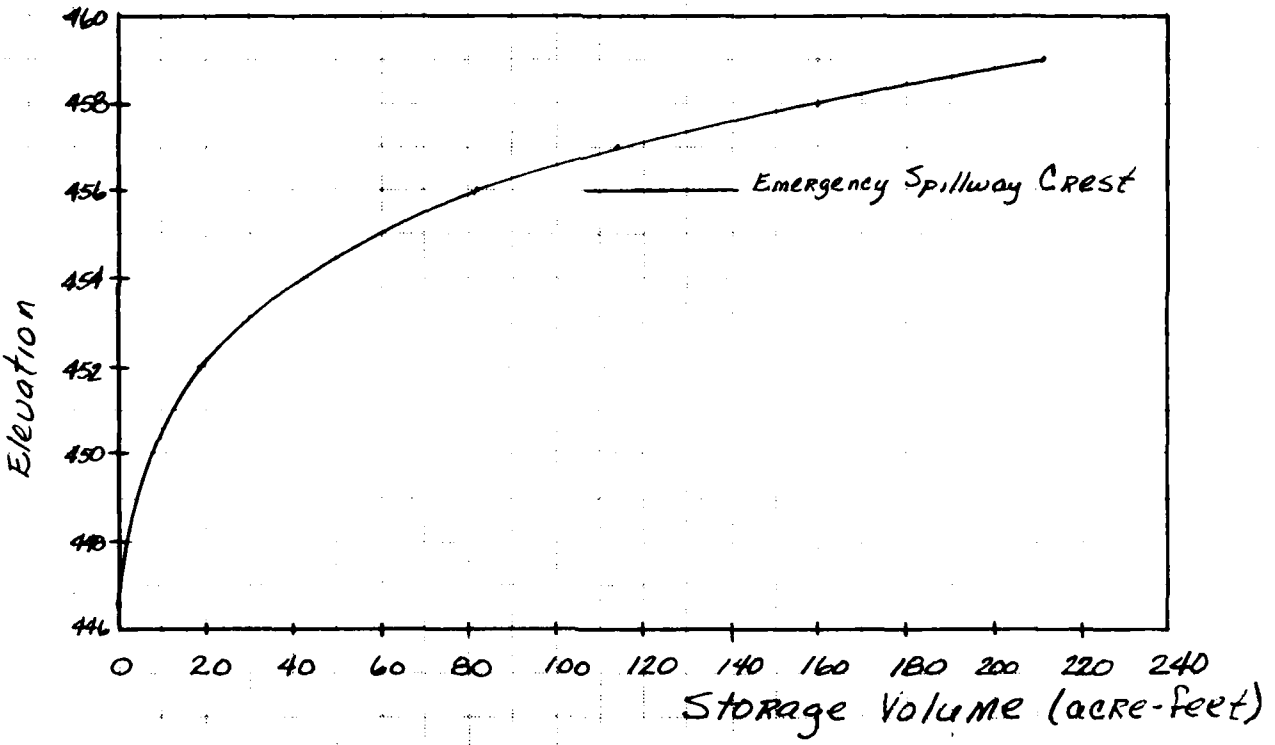
STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315•797•5800

DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections 1981 DATE 1-29-81

SUBJECT Larkin Creek Dam PROJECT NO. 2520

Stage-Storage Curve DRAWN BY JAJ



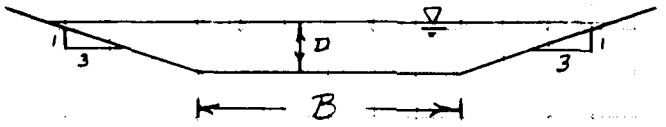
STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501
TEL 315-797-5800

DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections 1981 DATE 2-11-81

SUBJECT Larkin Creek Dam PROJECT NO 2550

Spillway Channel Depth of Flow Determination DRAWN BY JAG



Height of Riprap above channel bottom ~2'
$n \sim 0.035$
Channel Slope varies from 1% at upper end to ~2% near confluence with receiving stream.

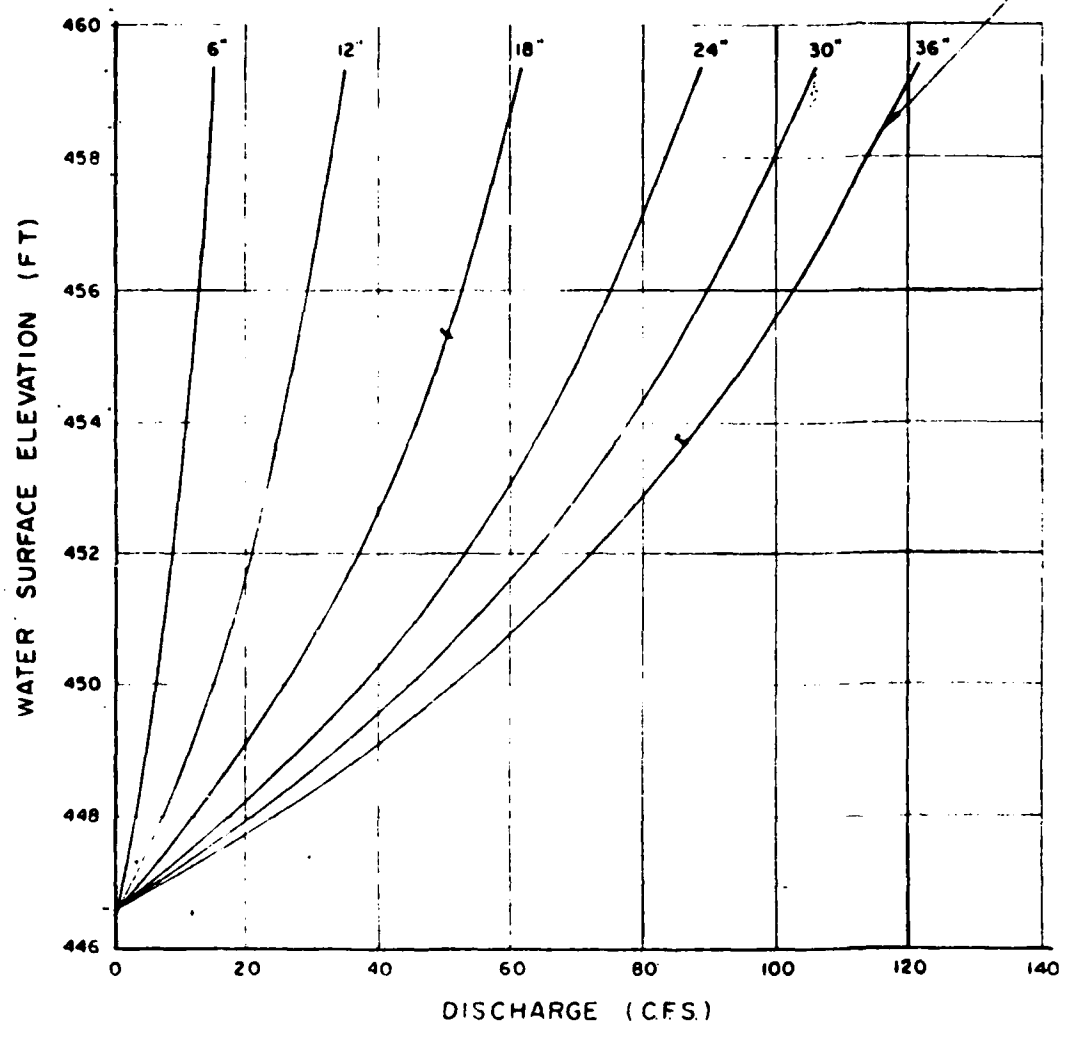
Bottom width varies from 25' at upper end to ~30' in S=2% region (lower end)

½ PMF discharge ≅ 1135 cfs

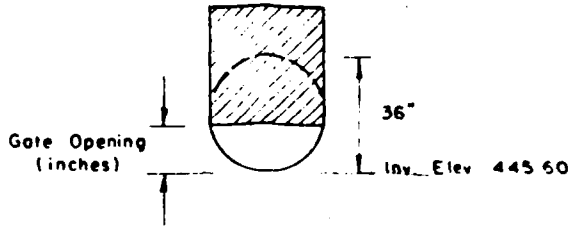
B	$K' = \frac{Q_n}{B^{8/3} S^{1/2}}$	D/B^*	D	A	V
30'	0.0323	.0944	2.83'	109 ft²	10.4 fps
50'	0.00828	.0431	2.15'	124.7	9.3

In both cases flow will exceed the height of Riprap and the velocities are in excess of permissible velocities for the channel bottom slope protection. This analysis neglects tailwater and transitional effects. Freeboard requirements would increase height of Riprap beyond the depths of flow calculated here.

* from "Handbook of Hydraulics" by Brater



NOTE CHART INDICATES THEORETICAL FLOW BASED ON FREE DISCHARGE GRAPH BASED ON DATA FROM "LIMITATIONS OF METERGATES" ASCE JOURNAL OF IRRIGATION & DRAINAGE, DEC 1962, Pg 26, PAPER # 3359 ; AND SOIL CONSERVATION SERVICE NOMOGRAPH FOR FREE DISCHARGE THRU PARTIALLY OPEN GATES. ACTUAL VALUES MAY VARY FROM THOSE INDICATED



$$Q = 6.32\ C_v\ D^2\ H^{1/2}$$

Q = Design discharge rate

Cv = Gate discharge cofficient

D = Diameter , in feet

H = Head, in feet, measured to the centerline of conduit

STAGE - DISCHARGE CURVES

LARKIN CREEK
DETENTION FACILITY NO. 1
ST ANDREWS DRIVE

William C. Larsen, P.E., P.C.
CIVIL · SANITARY · MUNICIPAL
ENGINEERING
44 SAGINAW DRIVE – ROCHESTER N.Y. 14623
AREA CODE 716 473-3460

Lumin Creek Dam
NY # 711

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	459	53	212
2) Design High Water (Max. Design Pool)	458	—	—
3) Principal [redacted] Spillway Crest	446.5	0	0
4) Pool Level with Flashboards	N/A		
5) Service Spillway Crest	455.75	26	82

DISCHARGES

	Volume (cfs)
1) Average Daily	Unknown
2) Spillway @ Maximum High Water	4290
3) Spillway @ Design High Water	2300
4) Spillway @ Auxiliary Spillway Crest Elevation	N/A
5) Low Level Outlet (@ top of dam elev. w/ gates fully open)	120
6) Total (of all facilities) @ Maximum High Water	4410
7) Maximum Known Flood	— — —
8) At Time of Inspection	Unknown

Res. @ Elev. 453.3
Q ~ 17 cfs
Outflow

CREST: ELEVATION: 459

Type: Earth fill

Width: 10' Length: 2100'

Spillover N/A

Location

SPILLWAY:

PRINCIPAL		EMERGENCY
446.5	Elevation	455.75
36"Ø RCP	Type	Trapezoidal
	Bottom Width	275'
	Type of Control	
	Uncontrolled	✓
	Controlled:	
Sluice gate	Type (Flashboards; gate)	
	Number	
36" square	Size/Length	
	Invert Material	
	Anticipated Length of operating service	
	Chute Length	
	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	

HYDROMETEROLOGICAL GAGES:

Type : Staff gage

Location: Just upstream of 36"Ø pipe inlet

Records: On file with Town of Greece, Engineer's office

Date -

Max. Reading - Unknown

FLOOD WATER CONTROL SYSTEM:

Warning System: None.

Method of Controlled Releases (mechanisms):

Through sluice gated 36"Ø RCP low level outlet

DRAINAGE AREA: 0.96 mi^2

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: Pasture & wooded

Terrain - Relief: moderately sloped

Surface - Soil:

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

Existing plans call for majority of drainage to stay undeveloped.

Potential Sedimentation problem areas (natural or man-made; present or future)

None known

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

None

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: No low reaches known

Elevation:

Reservoir:

Length @ Maximum Pool 0.45 ± (Miles)

Length of Shoreline (@ Spillway Crest) 1.2 ± (Miles)

```
(0001)  A1      LARKIN CREEK DAM     FILE IS ABPX
(0002)  A2      HEC-1DB (SNYDER PAREMETERS)
(0003)  A3      PMF - DAM OVER TOPPING ANALYSIS
(0004)  B     90       1        0        0        0        0        0        4        0
(0005)  B1     5       0        0        0        0        0        0        0        0
(0006)  J      1       7        1        0        0        0        0        0        0
(0007)  J1   0.2     0.3      0.4      0.5      0.6      0.8      1.0        0        0
(0008)  K      0     100        0        0        0        0        1        0        0
(0009)  K1      RUNOFF SUBAREA 1
(0010)  M      1       1    0.964        0    0.964        0        0        1        0
(0011)  P      0    21.6      117      127      141      151        0        0        0
(0012)  T      0       0        0        0        0        0      1.0      0.1        0      .08
(0013)  W   2.12   0.625        0        0        0        0        0        0        0        0
(0014)  X   -2.0   -0.13      1.6        0        0        0        0        0        0        0
(0015)  K      1     100        0        0        0        0        1        0        0        0
(0016)  K1      ROUTE THRU RESERVOIR AND OVER SPILLWAY
(0017)  Y      0       0        0        1        1        0        0        0        0        0
(0018)  Y1     1       0        0        0        0        0     -456       -1        0        0
(0019)  Y4   456  456.25    456.5   456.75      457   457.25    457.5   457.75      458    458.5
(0020)  Y4   459   459.5      460    460.5      461
(0021)  Y5     0     101      287      527      814     1139     1500     1894     2318     3251
(0022)  Y5  4288    5463     6650     7963     9360
(0023)  $S     0      11       62      114      168      212      265
(0024)  $E 446.6     452      456      457      458      459      460
(0025)  $$   456
(0026)  $D   459    2.65      1.5     2110        0        0        0        0        0        0
(0027)  K      1     454        0        0        0        0        1        0        0        0
(0028)  K1      SPILLWAY CHANNEL ROUTE
(0029)  Y      0       0        0        1        1        0        0        0        0        0
(0030)  Y1     1       0        0        0        0        0       -1        0        0        0
(0031)  Y6  .035    .035     .035      455      459      310   0.0065        0        0        0
(0032)  Y7   100     460      107      458      113      456      116      455      315      455
(0033)  Y7   318     456      324      458      326      459        0        0        0        0
(0034)  K      1     452        0        0        0        0        1        0        0        0
(0035)  K1      SPILLWAY CHANNEL ROUTE
(0036)  Y      0       0        0        1        1        0        0        0        0        0
(0037)  Y1     1       0        0        0        0        0       -1        0        0        0
(0038)  Y6  .035    .035     .035      453      459      212   0.0094        0        0        0
```

```
(0039)  Y7    61   456.5    100    456    107    454     11     453    263    453
(0040)  Y7   266      454    272    456    281    459      .       0      0      0
(0041)  K      1      450      0      0      0      0      1       0      0      0
(0042)  K1          SPILLWAY CHANNEL ROUTE
(0043)  Y      0        0      0      1      1      0      0       0      0      0
(0044)  Y1     1        0      0      0      0      0     -1       0      0      0
(0045)  Y6  .035     .035   .035    451    459    195  0.0103      0      0
(0046)  Y7    60    454.5    100    454    106    452    109     451    202    451
(0047)  Y7   205      452    218    456    227    459      0       0      0      0
(0048)  K      1      449      0      0      0      0      1       0      0      0
(0049)  K1          SPILLWAY CHANNEL ROUTE
(0050)  Y      0        0      0      1      1      0      0       0      0      0
(0051)  Y1     1        0      0      0      0      0     -1       0      0      0
(0052)  Y6  .035     .035   .035    449    459    100  0.020      0      0      0
(0053)  Y7    60    451.3    100    451    104    450    107     449    150    449
(0054)  Y7   153      450    177    454    192    459      0       0      0      0
(0055)  K     99        0      0      0      0      0      0       0      0      0
(0056)  A
(0057)  A
(0058)  A
(0059)  A
(0060)  A
```

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	100
ROUTE HYDROGRAPH TO	100
ROUTE HYDROGRAPH TO	454
ROUTE HYDROGRAPH TO	452
ROUTE HYDROGRAPH TO	450
ROUTE HYDROGRAPH TO	449

END OF NETWORK

```
**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
**********************************

RUN  DATE?WED, FEB 11 1981
     TIME?15:26:12

          LARKIN CREEK DAM      FILE IS A8PX
          HEC-1DB (SNYDER PAREMETERS)
          PMF - DAM OVER TOPPING ANALYSIS

                                JOB SPECIFICATION
      NQ      NHR     NMIN     IDAY     IHR     IMIN    METRC     IPLT     IPRT    NSTAN
      90        1        0        0       0        0        0        0        4        0
                              JOPER      NWT   LROPT    TRACE
                                  5        0       0        0

                          MULTI-PLAN ANALYSES TO BE PERFORMED
                              NPLAN= 1 NRTIO= 7 LRTIO= 1
                RTIOS=    0.20    0.30    0.40    0.50    0.60    0.80    1.00

**********      **********      **********      **********      **********

                          SUB-AREA RUNOFF COMPUTATION

                RUNOFF SUBAREA 1
                          ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            100       0       0       0       0       0       1       0       0

                                HYDROGRAPH DATA
                IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                    1       1    0.96    0.00    0.96    0.00   0.000       0       1       0

                                PRECIP DATA
                          SPFE     PMS      R6     R12     R24     R48     R72     R96
                          0.00   21.60  117.00  127.00  141.00  151.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.800

                                LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
              0    0.00    0.00    1.00    0.00    0.00    1.00    1.00    0.10    0.00    0.00

                                UNIT HYDROGRAPH DATA
```

TP= 2.12 CP=0.63 RTIA= 0

RECESSION DATA
STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.60

UNIT HYDROGRAPH 11 END-OF-PERIOD ORDINATES, LAG= 2.12 HOURS, CP= 0.63 VOL= 1.00
46. 142. 171. 117. 65. 36. 20. 11. 6. 3.
2.

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	26.09	22.64	3.45	17908.
										(663.)	(575.)	(88.)	(507.10)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTE THRU RESERVOIR AND OVER SPILLWAY

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
100	1	0	0	0	0	1	0	0

ROUTING DATA

GLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-456.	-1

STAGE	456.00	456.25	456.50	456.75	457.00	457.25	457.50	457.75	458.00
	459.00	459.50	460.00	460.50	461.00				
FLOW	0.00	101.00	287.00	527.00	814.00	1139.00	1500.00	1894.00	2318.00
	4288.00	5423.00	6650.00	7963.00	9360.00				
CAPACITY=	0.	11.	82.	114.	160.	212.	265.		
ELEVATION=	447.	452.	456.	457.	458.	459.	460.		

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
456.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
459.0	2.6	1.5	2110.

PEAK OUTFLOW IS 457. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 695. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 913. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 1134. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 1373. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 1845. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 2316. AT TIME 42.00 HOURS

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

SPILLWAY CHANNEL ROUTE

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
454	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

GN(1)	GN(2)	GN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0350	0.0350	0.0350	455.0	459.0	310.	0.00650

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00 460.00 107.00 458.00 113.00 456.00 116.00 455.00 315.00 455.00
318.00 456.00 324.00 458.00 326.00 459.00

STORAGE	0.00	0.30	0.60	0.90	1.21	1.51	1.82	2.13	2.45
	3.06	3.39	3.71	4.04	4.36	4.68	5.01	5.34	5.67
OUTFLOW	0.00	50.92	161.81	318.31	514.60	747.84	1017.54	1319.91	1653.57
	2410.38	2831.77	3280.87	3757.07	4259.84	4788.86	5343.57	5923.52	6528.37
STAGE	455.00	455.21	455.42	455.63	455.84	456.05	456.26	456.47	456.68
	457.11	457.32	457.53	457.74	457.95	458.16	458.37	458.58	458.79
FLOW	0.00	50.92	161.81	318.31	514.60	747.84	1017.54	1319.91	1653.57
	2410.38	2831.77	3280.87	3757.07	4259.84	4788.86	5343.57	5923.52	6528.37

MAXIMUM STAGE IS 455.8

MAXIMUM STAGE IS 456.0

MAXIMUM STAGE IS 456.2

MAXIMUM STAGE IS 456.3

MAXIMUM STAGE IS 456.5

MAXIMUM STAGE IS 456.8

MAXIMUM STAGE IS 457.1

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

SPILLWAY	CHANNEL	ROUTE						
ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
452	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0350	0.0350	0.0350	453.0	459.0	212.	0.00940

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
60.00 456.50 100.00 456.00 107.00 454.00 110.00 453.00 263.00 453.00
266.00 454.00 272.00 456.00 281.00 459.00

STORAGE	0.00	0.24	0.48	0.72	0.96	1.21	1.46	1.72	1.98
	2.51	2.81	3.14	3.47	3.80	4.13	4.47	4.81	5.14
OUTFLOW	0.00	92.60	294.49	579.85	943.35	1376.81	1875.48	2436.43	3057.44
	4460.69	5260.13	6155.85	7127.00	8168.33	9277.11	10451.26	11689.04	12989.02
STAGE	453.00	453.32	453.63	453.95	454.26	454.58	454.89	455.21	455.53
	455.84	456.16	456.47	456.79	457.10	457.42	457.73	458.05	458.36

FLOW	0.00	92.60	294.49	579.85	943.35	1376.81	1875.48	2436.43	3057.44
	4460.69	5260.13	6155.85	7127.00	8168.33	9277.11	10451.26	11689.04	12989.02

MAXIMUM STAGE IS 453.8

MAXIMUM STAGE IS 454.0

MAXIMUM STAGE IS 454.2

MAXIMUM STAGE IS 454.4

MAXIMUM STAGE IS 454.6

MAXIMUM STAGE IS 454.9

MAXIMUM STAGE IS 455.1

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

SPILLWAY CHANNEL ROUTE

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
450	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0350	0.0350	0.0350	451.0	459.0	195.	0.01030

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

60.00 454.50 100.00 454.00 106.00 452.00 109.00 451.00 202.00 451.00
205.00 452.00 216.00 456.00 227.00 459.00

STORAGE	0.00	0.18	0.36	0.55	0.74	0.94	1.14	1.35	1.58
	2.16	2.45	2.75	3.05	3.35	3.65	3.96	4.27	4.58
OUTFLOW	0.00	95.88	303.08	605.47	995.02	1459.24	1985.33	2569.11	3255.50

	4965.47	5973.87	7074.71	8265.01	9541.21	10901.08	12342.79	13864.79	15465.73
STAGE	451.00	451.42	451.84	452.26	452.68	453.11	453.53	453.95	454.37
	455.21	455.63	456.05	456.47	456.89	457.32	457.74	458.16	458.58
FLOW	0.00	95.38	303.98	605.14	990.07	1451.26	1985.37	2590.11	3255.50
	4965.47	5973.87	7074.71	8265.01	9541.21	10901.08	12342.79	13864.79	15465.73

MAXIMUM STAGE IS 452.1

MAXIMUM STAGE IS 452.4

MAXIMUM STAGE IS 452.6

MAXIMUM STAGE IS 452.8

MAXIMUM STAGE IS 453.0

MAXIMUM STAGE IS 453.4

MAXIMUM STAGE IS 453.8

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

SPILLWAY CHANNEL ROUTE

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
449	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

GN(1)	GN(2)	GN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0350	0.0350	0.0350	449.0	459.0	100.	0.02000

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

60.00 451.30 130.00 451.00 134.00 450.00 167.00 449.00 150.00 449.00
153.00 450.00 177.00 454.00 192.00 459.00

STORAGE	0.00	0.05	0.11	0.17	0.25	0.36	0.49	0.62	0.75
	1.03	1.17	1.32	1.47	1.62	1.77	1.92	2.07	2.23
OUTFLOW	0.00	89.75	289.51	593.05	987.56	1552.99	2314.46	3241.58	4324.36
	6945.46	8483.61	10157.55	11964.04	13900.47	15964.72	18155.05	20470.02	22908.43
STAGE	449.00	449.53	450.05	450.58	451.11	451.63	452.16	452.68	453.21
	454.26	454.79	455.32	455.84	456.37	456.89	457.42	457.95	458.47
FLOW	0.00	89.75	289.51	593.05	987.56	1552.99	2314.46	3241.58	4324.36
	6945.46	8483.61	10157.55	11964.04	13900.47	15964.72	18155.05	20470.02	22908.43

MAXIMUM STAGE IS 450.3

MAXIMUM STAGE IS 450.7

MAXIMUM STAGE IS 451.0

MAXIMUM STAGE IS 451.2

MAXIMUM STAGE IS 451.5

MAXIMUM STAGE IS 451.8

MAXIMUM STAGE IS 452.2

********** ********** ********** ********** **********

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 0.20	RATIO 2 0.30	RATIO 3 0.40	RATIO 4 0.50	RATIO 5 0.60	RATIO 6 0.80	RATIO 7 1.00
HYDROGRAPH AT	100	0.96	1	472.	708.	943.	1179.	1415.	1887.	2358.
	(	2.50)	(	13.36)(	20.03)(	26.71)(	33.39)(	40.07)(	53.43)(	66.78)(
ROUTED TO	100	0.96	1	457.	695.	913.	1134.	1373.	1845.	2316.
	(	2.50)	(	12.94)(	19.67)(	25.85)(	32.11)(	38.88)(	52.25)(	65.59)(
ROUTED TO	454	0.96	1	454.	695.	914.	1133.	1370.	1843.	2316.
	(	2.50)	(	12.87)(	19.67)(	25.88)(	32.09)(	38.78)(	52.19)(	65.58)(
ROUTED TO	452	0.96	1	455.	694.	914.	1133.	1369.	1842.	2316.
	(	2.50)	(	12.87)(	19.65)(	25.87)(	32.08)(	38.76)(	52.15)(	65.57)(
ROUTED TO	45_	0.96	1	455.	693.	913.	1133.	1368.	1841.	2315.
	(	2.50)	(	12.88)(	19.63)(	25.86)(	32.07)(	38.74)(	52.13)(	65.56)(
ROUTED TO	449	0.96	1	455.	693.	913.	1132.	1368.	1841.	2315.
	(	2.50)	(	12.88)(	19.62)(	25.86)(	32.06)(	38.73)(	52.12)(	65.56)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	456.00	456.00	459.00
STORAGE	82.	82.	212.
OUTFLOW	0.	0.	4288.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.20	456.68	0.00	104.	457.	0.00	42.00	0.00
0.30	456.90	0.00	111.	695.	0.00	42.00	0.00
0.40	457.08	0.00	118.	913.	0.00	42.00	0.00
0.50	457.25	0.00	125.	1134.	0.00	42.00	0.00
0.60	457.41	0.00	133.	1373.	0.00	42.00	0.00
0.80	457.72	0.00	147.	1845.	0.00	42.00	0.00
1.00	458.00	0.00	160.	2316.	0.00	42.00	0.00

PLAN 1 STATION 454

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	454.	455.8	42.00
0.30	695.	456.0	42.00
0.40	914.	456.2	42.00
0.50	1133.	456.3	42.00
0.60	1370.	456.5	42.00
0.80	1843.	456.8	42.00
1.00	2316.	457.1	42.00

PLAN 1 STATION 452

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	455.	453.8	42.00
0.30	694.	454.0	42.00
0.40	914.	454.2	42.00
0.50	1133.	454.4	42.00
0.60	1369.	454.6	42.00
0.80	1842.	454.9	42.00
1.00	2316.	455.1	42.00

PLAN 1 STATION 450

RATIO	MAXIMUM	MAXIMUM	TIME

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	455.	452.1	42.00
0.30	693.	452.4	42.00
0.40	913.	452.6	42.00
0.50	1133.	452.8	42.00
0.60	1368.	453.0	42.00
0.80	1841.	453.4	42.00
1.00	2315.	453.8	42.00

PLAN 1 STATION 449

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	455.	450.3	42.00
0.30	693.	450.7	42.00
0.40	913.	451.0	42.00
0.50	1132.	451.2	42.00
0.60	1368.	451.5	42.00
0.80	1841.	451.8	42.00
1.00	2315.	452.2	42.00

APPENDIX D

REFERENCES

APPENDIX D

REFERENCES

1. Department of the Army, Office of the Chief of Engineers. National Program of Investigation of Dams; Appendix D: Recommended Guidelines for Safety Inspection of Dams, 1976

2. U.S. Nuclear Regulatory Commission: Design Basis Floods for Nuclear Power Plants, Regulating Guide 1.59, Revision 2, August 1977

3. Linsley and Franzini: Water Resources Engineering, Second Edition, McGraw-Hill (1972)

4. W. Viessman, Jr., J. Knapp, G. Lewis, 1977, 2nd Edition, Introduction to Hydrology

5. Ven Te Chow: Handbook of Applied Hydrology, McGraw-Hill, 1964

6. The Hydrologic Engineering Center: Computer Program 723-X6-L2010, HEC-1 Flood Hydrograph Package, User's Manual, Corps of Engineers, U.S. Army, 609 Second Street, Davis, California 95616, January 1973

7. The Hydrologic Engineering Center, Computer Program: Flood Hydrograph Package (HEC-1) Users Manual For Dam Safety

8. Soil Conservation Service (Engineering Division): Urban Hydrology for Small Watersheds, Technical Release No. 55, U.S. Department of Agriculture, January 1975

9. H.W. King, E.F. Brater: Handbook of Hydraulics, McGraw-Hill, 5th Edition, 1963

10. Ven Te Chow: Open Channel Hydraulics, McGraw-Hill, 1959

11. Bureau of Reclamation, United States Department of the Interior, Design of Small Dams: A Water Resources Technical Publication, Third Printing, 1965

12. J.T. Riedel, J.F. Appleby and R.W. Schloemer: Hydrometeorological Report No. 33, U.S. Department of Commerce, U.S. Department of Army, Corps of Engineers, Washington, D.C., April 1956. Available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.

13. North Atlantic Regional Water Resources Study Coordinating Committee: Appendix C, Climate, Meteorology and Hydrology, February 1972

14. Sherard, Woodward, Gizienski, Clevenger: Earth and Earth - Rock Dams, John Wiley and Sons, Inc., 1963

15. U.S. Soil Conservation Service, Stillwater Outdoor Hydraulic Laboratory: Handbook of Channel Design for Soil and Water Conservation, SCS-TP-61, March 1974; revised June 1954

16. The University of the State of New York - The State Education Department, State Museum and Science Service, Geological Survey: Geologic Map of New York, 1970

17. C.A. Hartnagel, 1907, Geologic Map of the Rochester and Ontario Beach Quadrangles, New York State Museum Bulletin 114

18. Soil Survey of Monroe County, New York, 1977, United States Department of Agriculture, Soil Conservation Service

19. Guidebook for Field Trips in Wester New York, 1956, New York State Geological Association 28th Annual Meeting at the University of Rochester, N.Y.

20. William C. Larsen, P.E.: Preliminary Engineering Report; Larkin Creek Watershed Retention Basin Number One, St. Andrews Drive, August 1974; revised April 1975.

21. Erdman, Anthony, Associates: Detailed Drainage Study, Buck Pond Watershed, Town of Greece, New York, July 1978

22. Federal Emergency Management Agency, Federal Insurance Administration: Flood Insurance Study, Town of Greece, New York, Monroe County, September 1979

APPENDIX E

PREVIOUS INSPECTION REPORTS/AVAILABLE DOCUMENTS

William C. Larsen, P.E.
John F. Karle, P.E.
Richard N. Passero, P.E.

William C. Larsen, P.E., P.C.

CIVIL - SANITARY - MUNICIPAL
ENGINEERING
44 SAGINAW DRIVE - ROCHESTER, N.Y. 14623
AREA CODE 716/473-3460

Franklin Jack Buholtz, P.E.
Dale F. Green, P.E.
James R. Greeene, P.E.
Hakim A. Hakim, P.E.
Shree R. Shrivastava, P.E.
Iqbal M. Singh, P.E.
Peter J. Smith, P.E.
Yash P. Wadhwa, P.E.
LaVern R. Celestino, P.L.S.
Edward T. Nicoletta, P.L.S.

JGT 1570
December 21, 1977

Mr. Louis M. Concra, Jr., P.E.
Central Permit Agent
NYS DEC
50 Wolf Road
Albany, NY 12233

RE: CERTIFICATION OF CONSTRUCTION
PERMIT #828-75-1152

Dear Mr. Concra:

Please be advised that the construction authorized under the above referenced permit in the Town of Greece has been completed. In accordance with the conditions of the permit issuance, this letter shall therefore serve as certification that the construction was performed under constant inspection by our office. We also subcontracted the services of a soils engineering firm to provide additional inspection services with regard to embankment construction.

The construction was completed in accordance with the plans and specifications as approved, with the following exceptions:

1. The cut-off trench from the centerline station 1+65 to centerline station 7+0 was deleted. During excavation and subgrade preparation in this area, it was determined that no defined sand layer actually existed in this area. Our soils consultant was called upon to field inspect this area and he recommended deletion of the cut-off wall as the existing soil was determined to be sufficiently impervious. Several isolated sandy soil pockets were excavated and backfilled with embankment material.

2. A crusher run access roadway was constructed along the top of the embankment from the end of the existing roadway to the discharge control structure. A vehicle by-pass around the structure was also constructed and a turn-around installed east of the discharge control structure. This was added to the project in order to facilitate access to the sluice gate controls by the Town maintenance personnel.

Mr. Louis M. Concra, Jr., P.E.
Central Permit Agent
NYS DEC
Albany NY

12/21/77

Upon completion of the as-built plans for this project, we will submit a copy to your office for review and filing. In the meantime, if you have any questions or comments regarding the project, please do not hesitate to call us.

Very truly yours

WILLIAM C. LARSEN, P.E., P.C.

William R. VanAlst

William R. VanAlst, P.E.

WRV:pd

cc: Don Riley, Supervisor
Town of Greece Engineering Dept.
Curt Rossow, Town Planner

STATE OF NEW YORK)
COUNTY OF MONROE) SS

On this 22 day of December 1977, personally appeared William R. VanAlst, P.E., Project Engineer for the firm of William C. Larsen, PE, PC, and acknowledged that he executed the foregoing instrument.

Reid L Shaw
Notary Public

Commission Expires: 3/30/79

JGT 1520

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATER RESOURCES COMMISSION
ALBANY, NEW YORK 12201

APPLICATION FOR PERMIT SUPPLEMENT

CONSTRUCITON OF EARTH DAM & APPURTENANCES

LARKIN CREEK (TRIB. 0-122-2)

TOWN OF GREECE, NEW YORK

Description of Downstream Area

Situated immediately downstream (north) of the proposed construction on Larkin Creek (Tributary 0-122-2) is the Country Club View Subdivision, a 150 lot development of single-family homes constructed in 1963. Larkin Creek is conducted through this subdivision in a grassed channel and series of elliptical concrete pipe culverts.

From this area, the stream flows across Elmgrove Road and through the Ridgemont Country Club. It then continues northward under Ridge Road (U.S. Route 104) and through wooded and open areas and along the rear of developed lots on North Avenue to a point just south of Mill Road, where it joins with another main tributary. Larkin Creek continues northward through relatively undeveloped lands, finally emptying into Lake Ontario through Buck Pond.

With the exception of Country Club View Subdivision, the western portion of which has had numerous flooding and erosion problem associated with the stream (approximately 20 lots), there is no appreciable development downstream along Larkin Creek.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DAM INSPECTION REPORT
(By Visual Inspection)

Dam Number	River Basin	Town	County	Hazard Class	Date & Inspector
40A-4227	W. Ontario	Greece	Monroe	C	7/5/77 KVA

Stream = Owner = Town of Greece

Type of Construction

- [x] Earth w/Concrete Spillway
- [ ] Earth w/Drop Inlet Pipe
- [ ] Earth w/Stone or Riprap Spillway
- [ ] Concrete
- [ ] Stone
- [ ] Timber
- [ ] Other _____

Use

- [ ] Water Supply
- [ ] Power
- [ ] Recreation - [ ] High Density
- [ ] Fish and Wildlife
- [ ] Farm Pond
- [ ] No Apparent Use-Abandoned
- [x] Flood Control
- [ ] Other _____

Estimated Impoundment Size 0 → 52. Acres ### Estimated Height of Dam above Streambed 11.5 Ft.

Condition of Spillway

- [x] Service satisfactory
- [ ] In need of repair or maintenance

- [x] Auxiliary satisfactory
- [ ] In need of repair or maintenance

Explain: _____

Condition of Non-Overflow Section

- [x] Satisfactory
- [ ] In need of repair or maintenance

Explain: _____

Condition of Mechanical Equipment

- [x] Satisfactory
- [ ] In need of repair or maintenance

Explain: _____

Siltation [ ] High [x] Low

Explain: _____

Remarks: _____

Evaluation (From Visual Inspection)

- [ ] Repairs req'd. beyond normal maint.
- [x] No defects observed beyond normal maint.

(I ____ DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ION REPORT
nspection)

nty	Hazard Class	Date & Inspector
01	C	7/5/77 KWK

= Town of Greece.

☐ Stone
☐ Timber
☐ Other _____

Use

☐ Water Supply
☐ Power
☐ Recreation - ☐ High Density
☐ Fish and Wildlife
☐ Farm Pond
☐ No Apparent Use-Abandoned
☑ Flood Control
☐ Other _____

Estimated Impoundment Size 0 → 52. Acres ~~Estimated~~ Height of Dam above Streambed 11.5 Ft.

Condition of Spillway

☑ Service satisfactory
☐ In need of repair or maintenance

☑ Auxiliary satisfactory
☐ In need of repair or maintenance

Explain: _____

Condition of Non-Overflow Section

☑ Satisfactory
☐ In need of repair or maintenance

Explain: _____

Condition of Mechanical Equipment

☑ Satisfactory
☐ In need of repair or maintenance

Explain: _____

Siltation ☐ High ☑ Low

Explain: _____

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATER RESOURCES COMMISSION
ALBANY, NEW YORK 12201

APPLICATION FOR PERMIT

for the Construction, Reconstruction or Repair of a Dam or Other Impoundment Structure under Conservation Law, Section 429 (c).

CONSERVATION DEPARTMENT USE ONLY
Application No. 828-15-1152
Dam No. 40A-4227
Watershed W. Ontario

Read instructions on the reverse side before completing this application. Please type or print clearly in ink.

1. NAME AND ADDRESS OF APPLICANT
First Name | M.I. | Last Name | Phone No.
Town of Greece | | | 225-2000
Street Address: 505 Ridge Road West
Post Office: Rochester | State: New York | Zip Code: 14625

2. NAME AND ADDRESS OF OWNER (If different from applicant)
First Name | M.I. | Last Name
Street Address:
Post Office | State | Zip Code

TYPE OF PROJECT: [X] Construction [ ] Reconstruction [ ] Repair

4. IS STATE-OWNED LAND TO BE USED? [ ] Yes [X] No

5. PROPOSED STARTING DATE: June 1976

EXPECTED COMPLETION DATE: Nov. 30, 1976

PROJECT DESCRIPTION

LOCATION OF DAM
Stream or Body of Water: Trib. to Larkin Creek | County: Monroe | Town: Greece | Give distance and direction from commonly accepted landmar: 4400'+ north of Barge Canal

LOCATION ON U.S. GEOLOGICAL SURVEY MAP
Name of Map: Rochester West | Latitude: 43°12'10" N | Longtitude: 77°44'30"

8. PROPOSED USE FOR IMPOUNDED WATER: Temporary Stormwater storage

9. STATE THE HEIGHT ABOVE SPILLCREST OF THE LOWEST PART OF THE IMMEDIATE UPSTREAM ADJOINING PROPERTY OR PROPERTIES: 9.5 Feet

IS THIS PROPOSED POND OR LAKE PART OF A PUBLIC WATER SUPPLY? [ ] Yes [X] No
If not, where is nearest downstream public water supply intake? No intakes on stream

11. SIZE OF AREA DRAINING INTO POND OR LAKE (Acres or Square Miles): 852 acres

12. THE DRAINAGE AREA IS COMPOSED OF: (Total = 100%)
11 % Forest | 23 % Cropland | 28 % Pasture | 13 % Other | 13 % Swamp | 12 % Suburban Lands | 0 % Urban Lands

13. TYPE OF SPILLWAY
[ ] Service Spillway – Auxiliary Spillway Combination
[ ] Single Spillway
[ ] Pipe Riser ONLY
[X] Other Gated conduit - Emergency spillway

14. DESIGNER'S ESTIMATE OF CLASS OF HAZARD (As described in "Guidelines for Small Earth Dam Designs")
[ ] Class "a" [ ] Class "b" [X] Class "c"
NOTE: Provide descriptive information on character of downstream area.

15a. SPILLWAY INFLOW DESIGN FLOOD
Frequency 40% of MPF | Flood Peak 2400 c.f.s. | Runoff Volume 23 in.

15b. SERVICE SPILLWAY INFLOW DESIGN FLOOD
Frequency 50yr | Flood Peak 290 c.f.s. | Runoff Volume 5.10

16. THE SINGLE SPILLWAY OR AUXILIARY SPILLWAY IS COMPOSED OF:
[ ] Vegated Earth [ ] Concrete [ ] Timber [ ] Rock-filled Crib [ ] Masonry [X] Other Gated Conduit

17. MAXIMUM VELOCITY WITHIN THE SINGLE OR AUXILIARY SPILLWAY: 3 f.p.s.

18. SINGLE OR AUXILIARY SPILLWAY DISCHARGE AT DESIGN HIGH WATER: 20 c.f.s.

19. TYPE OF ENERGY DISSIPATER PROVIDED ON SINGLE SPILLWAY
[ ] Hydraulic Jump Basin [ ] Drop Structure [X] Other see pla

20. POND OR LAKE WILL BE DRAINED BY MEANS OF: Gated Conduit

WATER WILL BE SUPPLIED TO RIPARIAN OWNERS DOWNSTREAM BY MEANS OF: Gated Conduit

HEIGHT OF DAM ABOVE STREA BED: 11.5' Feet

21. AREA-CAPACITY DATA
Answer 1, 2 and 3, OR 1, 2, 4, 5

	ELEVATION, Referred To Assumed Benchmark	SURFACE AREA	VOLUME STORED
1. Top of Dam	458.0 Feet	51.7 Acres	160 Acre-Feet
2. Design High Water -	456.0 Feet	26.3 Acres	82 Acre-Feet
3. Single Spillway Crest -	446.5 Feet	0 Acres	0 Acre-Feet
4. Auxiliary Spillway Crest	Feet	Acres	Acre-Feet
5. Service Spillway Crest	Feet	Acres	Acre-Feet

22. TYPE OF ENERGY DISSIPATER AT OUTLET OF CONDUIT:
[ ] Impact Basin [ ] Plunge Pool [ ] Hydraulic Jump Basin [X] Other see plans

IS PIPE RISER PROVIDED WITH AN ANTI-VORTE DEVICE? [ ] Yes [ ] No N.A.

23. DRAWDOWN TIMES: Answer 1 and 2, or 1, 3 and 4

1. Has provision been made to evacuate 90% of the storage below the lowest spillway crest within fourteen days? [X] Yes [ ] No
2. Can the single spillway evacuate 75% of the storage between the maximum design high water and the spillway crest within 48 hours? [X] Yes [ ] No
3. Can the Service Spillway evacuate 75% of the storage between the auxiliary spillway and the Service Spillway crests within seven days? [ ] Yes [ ] No
4. Can the Service Spillway and the Auxiliary Spillway in combination evacuate the storage between the design high water and the auxiliary spillway crest within 12 hours? [ ] Yes [ ] No

WR-38 (8/70)

OIL DATA – State the character of the bed and banks in respect to natural types of soil materials, hardness, perviousness, water bearing, effect of exposure to air and water, uniformity, etc.

See Report of James P. Collins, P.E.

If an earth dam, describe the material to be used in the embankment.

See Report of James P. Collins, P.E.

What is the source of embankment fill material(s)?

on-site borrow

...ere porous seams or fissures beneath the foundation of the proposed dam? ☐ Yes ☒ No | Method used to obtain the above soil data ☒ Soil Borings ☒ Test Pits

25. DESIGN ENGINEER Name of Agency or Individual	P.E. License No. of Individual	26. CONSTRUCTION ENGINEER OR CONTRACTOR Name of Agency or Individual	P.E. License No. of Individual
William C. Larsen, P.E.	*27718*		
Address: *44 Saginaw Dr., Rochester, NY 14623*		Address:	
Title: *Owner*		Title:	

. NAME AND ADDRESS OF OFFICIAL NEWSPAPER OF LOCALITY WHERE PROPOSED WORKS ARE LOCATED

Greece Post *4 South Main St.* *Pittsford, NY 14534*

ERTIFICATION

3. Application is hereby made to the Conservation Department acting in behalf of the Water Resources Commission pursuant to Sections 429(c) of the Conservation Law.

The applicant certifies that the above statements are true and agrees that the issuance of the permit is based on the accuracy thereof. As a condition to the issuance of a permit, the applicant accepts full legal responsibility for all damage, direct or indirect, of whatever nature and by whomever suffered, arising out of the project described herein and agrees to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from the said project.

6-24-95 (Date) *Janet Green Stuart* (Signature)

INSTRUCTIONS

1. Type or print in INK.
2. Five (5) copies of all papers including detail construction plans and specifications must be filed.
3. The plans and specifications submitted with the application must include the following information:
   - (a) A plan showing proposed dam, dam appurtenances, bench marks, topographic contours at dam and around the anticipated reservoir area, including 2-foot contours to 6 feet above high water level.
   - (b) A profile along the dam axis and a transverse section of the dam at its maximum height.
   - (c) A profile along the center line and transverse section, or sections, of the spillways including stilling basins, outlet work, and other details, if necessary, in design of the structures.
   - (d) A topographical plan to a suitable scale showing drainage area, normal water level in the lake or pond and owners property line metes and bounds.
   - (e) Specifications for materials and methods of construction.
   - (f) A log of all soil information available to the design engineer or conservationist and location of drill holes, test pits or other foundation exploration, location of borrow area, horizontal and vertical controls, if necessary.
   - (g) Additional drawings should be included to clearly show all details of the proposed works.
4. NO WORK of construction, reconstruction or repairs of the structure or structures SHALL BE STARTED UNTIL A PERMIT therefor has been issued by the New York State Water Resources Commission.
5. The design, preparation of plans, estimates and specifications and the supervision of the erection, reconstruction and repair of all the structures herein applied for shall be done by a licensed professional engineer, or in the case of farm ponds by an engineer or conservationist employed by a governmental agency cooperating with a soil conservation district, or by an engineer employed by the Department of Environmental Conservation.
6. A "Notice of Application" must be published by the applicant. The form of notice and instructions for publication will be furnished to the applicant by the Local Permit Agent to whom the application is delivered.
7. An information circular "*Guidelines for Small Earth Dam Designs*" is available upon request from the Water Resources Commission or the Local Permit Agent.
8. Samples of foundation, embankment and construction materials need not be furnished unless requested.

- ENVIRONMENTAL STUDIES
- LAND PLANNING
- SOLID WASTE MANAGEMENT
- WATER POLLUTION CONTROL
- WATER WORKS
- DRAINAGE
- HIGHWAYS
- ENGINEERING SURVEYS

William C. Larsen, P.E.

CIVIL - SANITARY - MUNICIPAL
ENGINEERING
44 SAGINAW DRIVE - ROCHESTER, N.Y. 14623
AREA CODE ~~716~~ 716 473-3460

John F. Karle, P.E.
Richard N. Passero, P.E.
JGT 1570

Nov. 26, 1975

Mr. Stanford J. Zeccolo,
Senior Hydraulic Engineer
Environmental Analysis
N.Y.S.D.E.C.
50 Wolf Road
Albany, N.Y.

RE: CONTRACT FOR CONSTRUCTION OF EARTH
DAM AND APPURTENANCES
LARKIN CREEK STORMWATER DETENTION FACILITY
NUMBER ONE - ST. ANDREWS DRIVE
TOWN OF GREECE DRAINAGE DISTRICT NO. 24
MONROE COUNTY, NEW YORK

Dear Mr. Zeccolo:

In regard to your letter of October 21, 1975 and our subsequent discussion with George Koch, we are enclosing the following material to constitute a revised submittal for the proposed Larkin Creek stormwater Detention Facility to be located in the Town of Greece:

(1) 3 copies of revised construction drawings

(2) 3 copies of St. Andrews Drive Profile

(3) 3 copies of Spillway Capacity Calculations

In addition, it is our understanding that you have in your possession the following supporting data submitted on Sept. 29, 1975:

(1) Application for permit

(2) Specifications

(3) Addendum to soils report including covering letter, test pit logs, revised site plan and revised soil profile

(4) Letter from Geotechnical Engineers in connection with subgrade preparation.

Mr. Stanford J. Zeccolo,
Senior Hydraulic Engineer Nov. 26, 1975

(5) Larsen letter of September 29, 1975 explaining previous revisions.

Basically, this submittal consists of a revised auxiliary spillway of a size and alignment to satisfy your various requirement. In addition we have raised the top of the embankment from elevation 458.0 to 459.0 to provide the required 1' of freeboard at a flow through the spillway of 2150 cfs. As a matter of explanation, we have attached a copy of sheet 4 ~~#3~~ of the construction drawings to the spillway calculations. The drawing has been marked to show locations of the calculated sections and other pertinent data. From field survey and office calculations it has been determined that at design flow (2150 cfs) water will pond in the spillway at elevation 452.87 Accordingly analysis of the spillway below that elevation should not be necessary.

We have analyzed the flow characteristics at the control section and at two separate transitions between the control section and the ponding surface. In all cases, the channel has sufficient capacity to carry the design flow. Velocities in the vicinity of transition section #2 are slightly greater than 8 ft/sec and as a result surge pile stone channel lining has been shown in that area.

With this revised submittal, it is our feeling that we have complied with all D.E.C. requirements.

If, upon your review there are any questions or any suggested modifications, please call us at once to set up a meeting to discuss these matters in detail.

May we hear from you at your earliest convenience.

Very truly yours,

DFG:pd Dale F. Green, P.E.

Enc.

cc: Louis M. Concra
George Koch ✓

JGT 1570

Nov 26 1975

PROPOSED ST. ANDREWS DR. RETENTION BASIN
TOWN OF GREECE

SPILLWAY CAPACITY CALCULATIONS

I. Compute ponding elevation of spillway discharge based on outflow of 2150 CFS and attached profile of Saint Andrews Drive.

$Q = CLH_{Avg.}^{3/2}$ where $H = 2H_{avg}$ = height of water above low point in road.

try $H_{avg} = 1.0'$

$Q = CLH_{Avg.}^{3/2}$

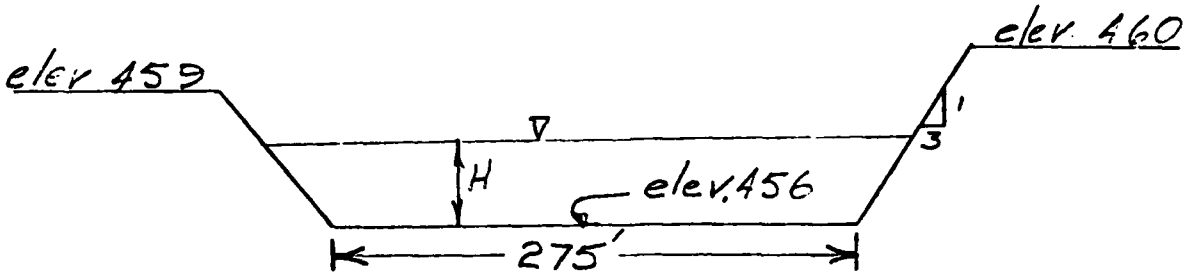
$2150 = 2.8 \times L \times 1.0$

$L = 768'$

for $H_{Avg} = 1.0$ ponded water surface = 452.87'

from road profile, for W.S. = 452.87, L = 770' check

II. Calculate water surface at control section



$Q = CLH^{3/2}$ Q = 2150 CFS

$2150 = 2.8 \times 275\ H^{3/2}$

$H^{3/2} = 2.79$

$H = 1.99'$

A = 2 + 275 - 550

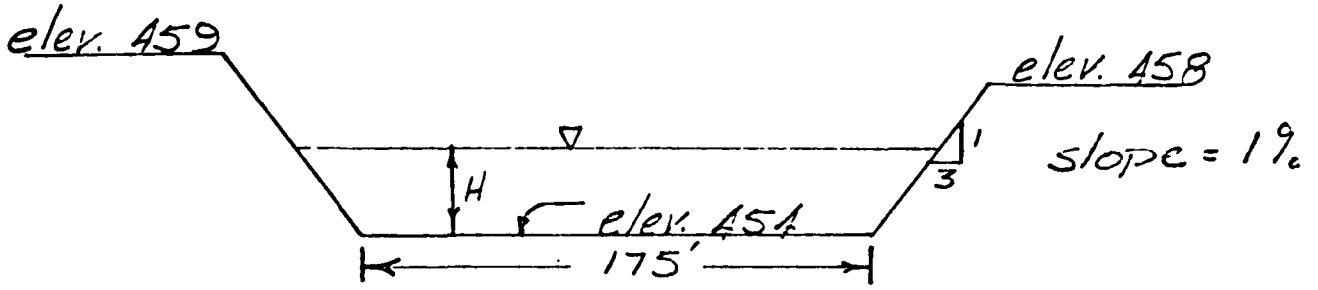
V = 2150/550 = 3.9 ft/sec (O.K.)

Water Surface Elevation = 457.99

Area of channel = $\frac{275 + 286.94}{2} \times 1.99 = 559.1$ S.F.

Velocity = $\frac{Q}{A} = \frac{2150}{559.1} = 3.85$ ft/sec < 8 ft/sec

III. Calculate Water Surface at Transition Section #1



$$Q = \frac{A}{N} \times 1.49\, R^{2/3}\, S^{1/2} \qquad \text{try } H = 1.60'$$

$$R = \frac{A}{P} = \frac{\frac{1}{2}(175 + 184.6) \times 1.6}{175 + 2(5.1)}$$

$$= \frac{287.7}{185.1} = 1.55$$

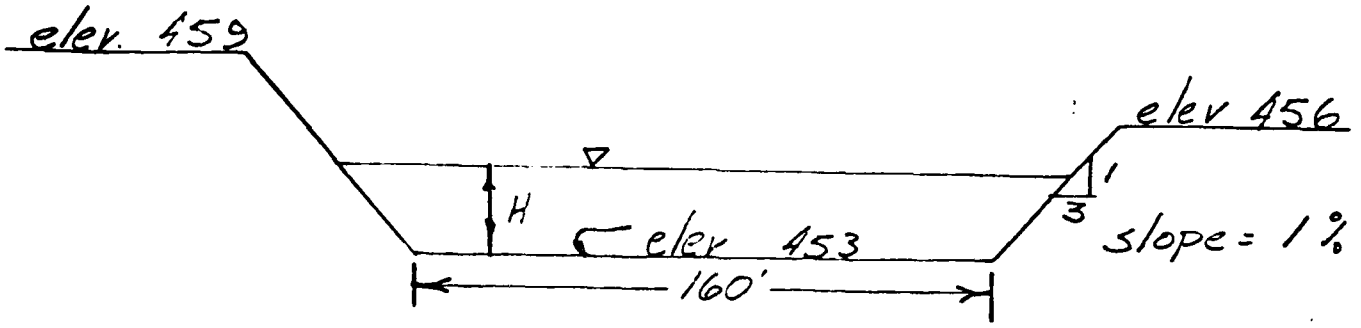
$$Q = \frac{287.7}{.025} \times 1.49 \times (1.55)^{2/3} (0.01)^{1/2}$$

$Q = 2299$ CFS $\neq$ 2150 CFS

find velocity at transition section

$$V = \frac{2299}{287.7} = 7.99 \text{ ft/sec}$$

IV. Calculate Water Surface at Transition Section #2



try H = 1.65'

$$R = \frac{A}{P} = \frac{\frac{1}{2}(160+169.9) \times 1.65'}{160 + 2(5.2)} = \frac{272.2}{170.4} = 1.60$$

$$Q = \frac{A}{n} \times 1.49 \, R^{2/3} \, S^{\frac{1}{2}}$$

$$Q = \frac{272.2}{.025} \times 1.49 \times 1.37 \times 0.1 = 2222 \text{ CFS}$$

Find velocity

$$V = \frac{2222}{272.2} = 8.16 \text{ ft/sec} > 8.0 \text{ ft/sec}$$

Install surge Pile stone channel lining

L. Cancro/S. Zaccolo - Environ. Analysis
W. Richter/G. Koch - PSCH
Review of Revised Plans for Proposed Larkin Creek Retention Basin,
Town of Greece -- Application No. 828-75-1152

October 17, 1975

We have reviewed the revised plans and the Engineer's letter submitted September 29, 1975. Following are our comments:

1. The top of dam must be raised so that there is 1 foot of freeboard above design high water.

Auxiliary Spillway Crest	=	El. 456.0
Depth of Flow of Peak Discharge	=	2.5 Ft.
Design High Water	=	El. 458.5
Freeboard	=	1.0 Ft.
Required El. for Top of Dam	=	El. 459.5

Item 21 on the permit should reflect the correct elevations.

2. At the meeting of September 24, 1975 we indicated that an earth spillway with a transition to a narrow channel was not acceptable because of the high velocities and the resulting erosion to the spillway channel in the vicinity of the adjacent homes. We indicated that if an earth spillway was still desired it would have to be revised so that the channel transition took place further downstream where the alignment was straight. We also indicated that in order to design such a channel a water surface profile is required to determine the depths of flow and the resulting velocities in the channel.

Our review indicates that the spillway channel shown is not acceptable because of the erosive velocities in the vicinity of lots #185 and #197, and that in some locations the depth of flow exceeds the channel height.

Please submit backwater computations with a profile of the water depths and velocities.

NOTE:
Phone conversation 17 Nov 75 between
L. Cancro and Dale Green.

1. Engr. will revise Emerg Spillway so that transition will occur further downstream.
2. Engr. will submit a backwater curve to determine W.S and Velocities

G. Koch
17 Nov. 75

GR:GK:bt

• ENVIRONMENTAL STUDIES
• LAND PLANNING
• SOLID WASTE MANAGEMENT
• WATER POLLUTION CONTROL

• WATER MAINS
• DRAINAGE
• HIGHWAYS
• ENGINEERING SURVEYS

William C. Larsen, P.E.

CIVIL - SANITARY - MUNICIPAL
ENGINEERING
44 SAGINAW DRIVE - ROCHESTER, N.Y. 14623
AREA CODE 716 473-3460

John F. Karle, P.E.
Richard N. Possero, P.E.

JGT 1570

September 29, 1975

Mr. Louis M. Concra, Jr., P.E.
Assistant Director for Conservation Engineering
NYS DEC
50 Wolf Rd
Albany, N.Y. 12233

RE: CONTRACT FOR CONSTRUCTION OF
EARTH DAM AND APPURTENANCES
LARKIN CREEK STORMWATER DETENTION FACILITY
NUMBER ONE - ST ANDREWS DRIVE
TOWN OF GREECE DRAINAGE DISTRICT NO. 24
MONROE COUNTY, NEW YORK

Dear Mr. Concra:

Reference is made to our recent meetings and correspondence in connection with the above referenced Stormwater Detention Facility to be located in the Town of Greece. Subsequent to our last meeting, we have revised the plans and have performed additional subsurface investigations. Accordingly, we are enclosing 5 copies of:

Application For Permit

Construction Drawings (under separate cover)

Addendum to Soils Report including covering letter, test pit logs, revised site plan and revised soil profile.

Letter from Geotechnical Engineers in connection with subgrade preparation

The following is a list and explanation of revisions to the original submittal:

1. The eastern portion of the embankment has been relocated approximately 200' to the south of its original position. The emergency spillway has been relocated to provide a more gradual turn into the exit channel and a concrete control section has been provided to prevent excessive erosion.

Mr. Louis M. Concra, Jr., P.E. 9/29/75

2. Payment Item No. 4 specifies that the maximum diameter of particles to be used in the embankment fill is 6".

3. The Application for Permit has been revised to reflect a spillway inflow design flood of 2400 cfs. Further, the proposed starting date is now shown as June 1976.

4. The emergency spillway is shown to be constructed in a "cut-section".

5. Since velocities over the emergency spillway for the design flow are less than 8 f.p.s. the surge pile stone channel lining has been eliminated. It has been retained in Sections of the spillway channel where erosion protection is required.

6. Centerline stationing has been provided along the axis of the dam.

7. Angle iron stops have been shown to prevent the sluice from being lowered more than 9" from the bottom.

8. In response to your request for a cut-off trench along the entire length of the dam, we offer the following comments: In those areas where granular material (less than 30% passing the #200 sieve) is encountered the specifications require that material be removed and replaced with suitable material from the borrow area. Such is the case with the granular deposit located between centerline stations 1+50-6+85. In addition, a minimum of 2' of native soil will be removed along the entire axis of the dam under Payment Item #2 - Subgrade Preparation. If any unsuitable soil is encountered in this "mucking out" operation, it too will be removed and replaced.

In effect, a minimum 2' deep cut off trench will be provided unless otherwise necessary. Our geotechnical consultants indicate that this can be done maintaining an acceptable factor of safety. Further, a qualified soils engineer will be present for the subgrade preparation and will have authority to order the contractor to remove and replace any questionable subgrade material.

Mr. Louis M. Concra, Jr., P.E. 9/29/75

It is our hope that the above revisions will satisfy the questions that you have raised in the past and that DEC approval of this project will be forthcoming shortly.

If you have any questions, please do not hesitate to call us.

Very truly yours,

DFG/pr

Dale F. Green, P.E.

Enc.

cc: Stanford J. Zeccolo
George Koch

Louis Concra/S. Zaccolo
George Koch
Review of proposed Larkin Creek Retention Basin
Town of Greece Application No. 828-75-1152
July 16, 1975

I have reviewed the hydrology and hydraulics for the proposed structure. Following are my comments.

Auxiliary Spillway

1. The alignment for the auxiliary spillway is not acceptable. The spillway channel should be perpendicular to the spillway crest. Discharge leaving the channel should be directed away from the embankment so there is no erosive effect on the embankment toe. The fact that homes are located within 50 feet of the spillway channel makes the alignment feature especially critical.

2. The auxiliary spillway does not have sufficient capacity to discharge the Spillway Inflow Design Flood (40% MPF). Our investigation indicated that the peak inflow for the design flood is 2800 cfs. Reservoir storage will reduce the peak outflow to 2150 cfs.

Service Spillway

The engineering report indicates that the discharge structure is designed to restrict flow out of the pond to a maximum discharge of 20 cfs. When the water surface is at the crest of the auxiliary spillway (El. 456) the discharge throught the 36 inch pipe will be about 100 cfs.

GK/jb

Meeting 5 Aug 75

Dale Green
Van Alst } Larkin Engr
Zecollo
Rob— Inlaverde
G. Koch

1. Will chge alignment of Emerg Spillway From Svc Spillway will swing away from Homes. Will also increase Emerg. Spillway capacity.
2. Allowed Engr to keep gate on Svc. Spillway.

- ENVIRONMENTAL STUDIES
- LAND PLANNING
- SOLID WASTE MANAGEMENT
- WATER POLLUTION CONTROL
- WATER WORKS
- DRAINAGE
- HIGHWAYS
- ENGINEERING SURVEYS

William C. Larsen, P.E.

CIVIL - SANITARY - MUNICIPAL

E N G I N E E R I N G

44 SAGINAW DRIVE - ROCHESTER, N.Y. 14623

AREA CODE 716 473-3460

John F. Korle, P.E.
Richard N. Possero, P.E.

JGT 1570

July 2, 1975

Mr. William MacGregor
NYS Department of Environmental Conservation
P.O. Box 57
Avon, N.Y. 14414

RE: CONTRACT FOR THE CONSTRUCTION OF EARTH DAM AND APPURTENANCES - LARKIN CREEK STORMWATER DETENTION FACILITIES - TOWN OF GREECE DRAINAGE DISTRICT #24 TOWN OF GREECE, MONROE COUNTY, NEW YORK

Dear Mr. MacGregor:

Pursuant to our recent telephone conversations, our meeting at your office on June 19th and our meeting in Albany on June 25, we are enclosing herewith five copies of the "Application Package" for the above referenced project under the requirements of Section 429(C) of the Conservation Law.

Each of the five packages contains:

1. Form - "Application for Permit"
2. Engineering Report
3. Soils Report prepared by the firm of Jas P Collins, PE
4. Construction Drawings
5. Specifications
6. Description of Downstream Area
7. Plan showing dam, appurtenances, contours and property lines as required under Item 3 of the instructions.

Since our initial discussions, several revisions to the plans have been made as a result of recommendations given at our meeting in Albany.

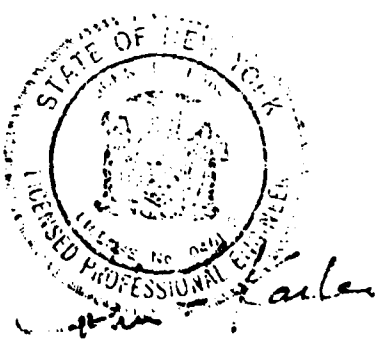
PRELIMINARY ENGINEERING REPORT

LARKIN CREEK WATERSHED
RETENTION BASIN NUMBER ONE
ST. ANDREWS DRIVE

Town of Greece *Natural Stream*
Improvement and Protection
Implementation Program
(I.P.I.P.)

AUGUST 1974

Revised April 7, 1975



IRONMENTAL STUDIES
D PLANNING
D WASTE MANAGEMENT
ER POLLUTION CONTROL

ER WORKS
NAGE
WAYS
NEERING SURVEYS

William C. Larsen, P.E.

CIVIL - SANITARY - MUNICIPAL
ENGINEERING
44 SAGINAW DRIVE - ROCHESTER, N.Y. 14623
AREA CODE 716 473-3460

John F. Karle, P.E.
Richard N. Possero, P.E.

August 29, 1974

Mr. Donald J. Riley, Supervisor
and Greece Town Board
2505 Ridge Rd. W.
Rochester, N.Y. 14626

RE: PRELIMINARY ENGINEERING REPORT
LARKIN CREEK WATERSHED
RETENTION BASIN NO. 1
TRIBUTARY 0-122-2
ST. ANDREWS DRIVE

TOWN OF GREECE NATURAL STREAM
IMPROVEMENT AND PROTECTION IMPLEMENTATION PROGRAM (IPIP)

Gentlemen:

We submit herewith our Preliminary Engineering Report on subject Retention Basin in accordance with your Resolution of July 2, 1974, based upon our Proposal of July 2, 1974.

The purpose of the Study and subsequent Report was to determine, in appropriate detail, a recommended solution for the drainage problems being encountered in the St. Andrews-Pine Valley-Old Meadow area, consistent with the goals outlined in the Greece Town-wide Drainage Study of July 1974. Because of the substantial flooding which has occurred late Spring and early Summer in this area we have moved ahead expeditiously to furnish solutions.

While the July 1974 Drainage Study furnished conceptual answers to this problem, it was the wish of the Town Board and the residents to explore alternative possibilities and to determine firm cost figures adequate to permit the Town Board to move ahead with a definite program if it seemed appropriate. To accomplish this it was necessary for us to insist upon the expenditure of sufficient money to permit rather detailed soil investigation and field survey work because of our very real concern of the presence of rock and the possibility of dewatering problems. This concern

Mr. William MacGregor 7/2/75

Generally, the proposed stormwater detention facility is intended to eliminate flooding in the vicinity of St Andrews Dr and alleviate erosion and siltation problems which presently occur during periods of heavy rainfall.

It is proposed to retain water on an intermittent basis only and to permit the "dry weather flow" to pass unrestricted.

Ponding limits have been shown to elevation 456.0 representing a maximum depth of water of 9.5 feet. This extent of ponding would result from a 50-year storm of critical duration with full upstream development of the entire watershed area.

Please be advised that the Town of Greece is most anxious to begin work on this project in order that it can be completed and placed in operation this construction season. Any assistance you could render in expediting the review and approval of this would be greatly appreciated.

If you have any questions or if you require any additional information, please do not hesitate to call us.

Very truly yours,

DFG/pr

Dale F. Green, P.E.

Enc.

cc: Eugene Penzimer

Mr. Donald J. Riley, Supervisor
and Greece Town Board

August 29, 1974

was justified when substantial amounts of high-elevation bedrock were encountered which prevented any further consideration of a retention pond north of the subdivision plus a relief channel around the subdivision.

Accordingly, this Report recommends a return to our original recommendation to construct a Retention Reservoir south of St. Andrews Drive on Monroe County land. We recommend that the embankment be constructed to an elevation which will permit a maximum storage of 81 acre feet with a freeboard of 2.0'.

While every effort has been made to expedite the submittal of this Report you are cautioned that the plans for the retention works recommended herein must be approved by the Department of Environmental Conservation. We are advised that such review normally takes sixty days. We must regretfully advise that this would preclude construction this Fall under the best of intentions by the Town. It does make the point, however, that decision-making must nevertheless move ahead rapidly if the project is to be designed and reviewed, and financing established, in time to permit a start after the first of the year. Clearing and grubbing could take place in late Spring with construction following in the Summer.

Very truly yours,

W.C. Larsen

William C. Larsen, P.E.

WCL/pr

cc: Gene Penzimer

PRELIMINARY

ENGINEERING REPORT

LARKIN CREEK WATERSHED RETENTION BASIN NO. 1

ST. ANDREWS DRIVE

A RECOMMENDED FACILITY
UNDER THE
TOWN OF GREECE NATURAL STREAM
IMPROVEMENT AND PROTECTION
IMPLEMENTATION PROGRAM
(I.P.I.P.)

TOWN OF GREECE
MONROE COUNTY, NEW YORK

AUGUST 197?

WILLIAM C. LARSEN, P. E.
Civil-Sanitary-Municipal
E N G I N E E R I N G
44 Saginaw Drive - Rochester, N.Y. 14623

TABLE OF CONTENTS

TABLE OF CONTENTS (CONT'D)

Appendices (cont'd)

N.B.: 1"=50' scale topo plans were also prepared under this Proposal but have not been included in the Report. They are on file in the Engineer's Office. These mapping sheets will form the basis for the project when undertaken.

I GENERAL - BACKGROUND

This Study is related to the recurring flooding problems which have been experienced in the vicinity of Saint Andrews Drive in the Town of Greece. This office became aware of the flooding problem and resulting property damage during our routine field investigations while preparing the Townwide Drainage Study. In addition, we were present at the preliminary discussions between the homeowners in the area and representatives of the Town concerning the problem.

As a result of our initial recommendation that a storm water retention pond be constructed to alleviate these problems the Town Board has authorized this more detailed Engineering Study in accordance with our proposal dated July 2, 1974.

II THE PROBLEM

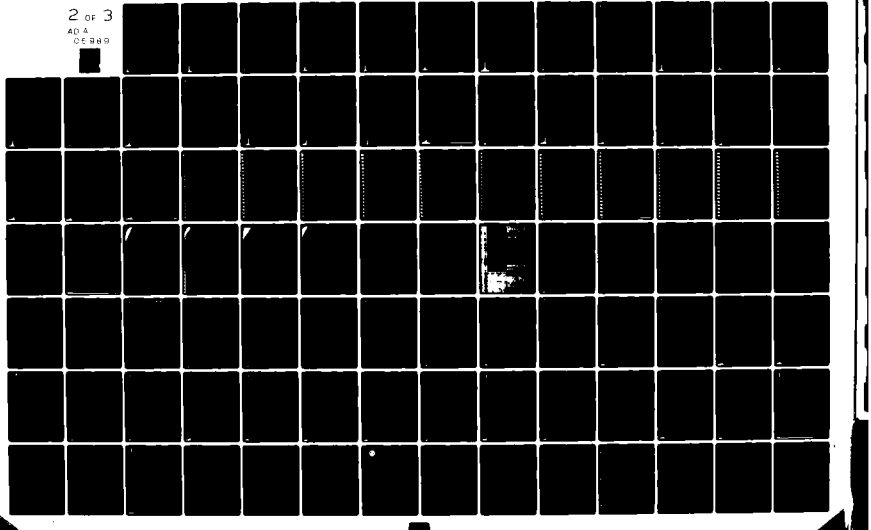
The area in which flooding occurs is within the Larkin Creek Watershed, Tributary 0-122-2.

There are 852 acres tributary to the Saint Andrews Drive culvert, 206 of which are located in the Town of Ogden. The remaining area is within the Town of Greece. During periods of heavy runoff, tributary 0-122-2 overtops its banks and causes flooding in the backyards and basements of the houses located on the south side of Saint Andrews Drive. In addition the excess storm water flows over Saint Andrews Drive and continues down the channel causing severe erosion and, in some cases, additional property damage. The problem itself can be attributed to several factors the combination of which result in the severe flooding:

First, portions of the development were constructed within the natural flooding limits of the creek. To compound the problem these houses have walkout basements which also become flooded.

AD-A105 989 STETSON-DALE UTICA NY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. LARKIN CREEK DAM (INVENTORY NUMBER--ETC(U)
JUN 81 J B STETSON DACW51-81-C-0009
UNCLASSIFIED NL

2 OF 3
AD A
105989



Second, the culverts under Saint Andrews, Pine Valley and Old Meadow Drive are undersized and as a result the water "backs up" in the vicinity of Saint Andrews Drive and Pine Valley.

Third, based upon interviews with homeowners it appears that this tributary reaches its "peak" rather quickly in a rainstorm....in a matter of two to four hours. This is faster than would be anticipated during a normal investigation of this watershed. Whether or not the various wetlands upstream of this point are indicative of high bedrock elevation (or impervious sub-soils), causing little percolation and subsequently high run-off, is simply a matter of conjecture. Nevertheless run-off is fast and intense.

Specifically, the following cases of nuisance and damage have been documented:

Cellar wall collapse

Cellars flooded and personal belongings ruined

Backyards flooded

Erosion of channel and adjacent yards

Destruction of private retaining walls

Undermining and erosive damage to town-owned drainage facilities.

III DISCUSSION OF ALTERNATIVE SOLUTIONS

The immediate problem which generated the need for this Preliminary Engineering Report was the aforementioned flooding occurring in Country Club View Subdivision. The larger problem, of which this is a part of course, is the recommended Improvement and Protection of the Natural Streams of the Town. While an immediate solution might be found for the Country Club Estates problem we feel that this solution (whatever it might be) should also be able to show benefit to the Town (or at least the watershed) at large, since a considerable expenditure of funds would be required in any event.

Four possible solutions to the immediate problem presented themselves:

1. A Retention Pond south of the subdivision which would discharge at a much reduced rate, permitting the Town to continue using all, or some, of the culverts existing under the subdivision streets.

2. A Diversion Channel around the subdivision which would by-pass the existing street culverts and channel. (However, this should also include a retention basin north of the subdivision to retard discharge since the "ponding effect" south of St. Andrews Drive would now be lost.)

3. Replace the culverts under the three east-west streets with large box culverts capable of passing the future anticipated peak flows at a rate which would prevent backup on the south side of St. Andrews Drive; and provide erosion protection works along the channel banks.

4. Continue to permit flooding to take place, and either provide flood protection works at the various effected homes, or purchase the homes and tear them down.

Engineering-wise it would be rather a simple matter to enlarge the subdivision culverts or to divert the creek around the subdivision and thus to let the high rates of runoff pass through or around the area without causing any appreciable damage in the immediate vicinity. The net effect would be to release the water which is now retained in the backyards and wooded area south of Saint Andrews Drive and to allow this water to continue downstream at higher rates of flow than are experienced today.

This type of solution, while it would alleviate the flooding in the Saint Andrews Drive area, would simply transfer flooding and erosion problems downstream. It is for this reason that we have discarded this type of solution as not being in the best interest of the Town of Greece.

/2

The fourth alternative, that of "flood-proofing" existing properties or else removing the homes, is not looked upon with favor by our office nor, we judge, would it be morally or politically acceptable. The work would consist of sealing off cellar windows and walk-out doors and filling backyards to prevent floodwaters from encroaching into the yards and basements. The flood waters would continue to overtop St. Andrews Drive. Downstream, water would continue to flood the backyards since they must be directly drained by gravity to the stream bank. The use of dikes and flood gates in this area would, in our opinion, be unrealistic and unsightly.

Therefore, it is our feeling that the most acceptable solution to this type of problem is to "hold back" the runoff in some type of retention facility during periods of heavy rainfall and then to discharge the water over a long period of time at low rates. The result would be to eliminate flooding problems in the immediate area, reduce erosion problems along the channel, and to substantially reduce the peak rates of flow downstream as well as downstream ecological damage and siltation.

The land adjacent to the study area will ultimately become part of the Monroe County Parks System. Portions of that future park are already owned by the County and other parcels remain in the hands of individual owners. A retention facility sized and located so as to be most effective must, by necessity, be located on lands which will someday be part of the County Park.

Accordingly, the following alternative locations have been investigated in an effort to not only solve the problem but to do so in a manner which would be compatible with the long range plans for the surrounding property:

1. Construct a retention pond south of Saint Andrews Drive. This could be accomplished by building a dam just to the south of the properties which now flood. The proposed elevation of the dam would be such as to allow ponding to elevation 456.0. This would provide adequate storage for a 50 year recurrance interval storm under fully developed upstream conditions. The discharge structure

would be designed so as to restrict flows out of the pond to a maximum of 20 cfs. The ponding which would occur upstream would be then sufficient to alleviate the downstream flooding conditions under ultimate conditions of upstream development. This pond would be designed to hold water only during periods of heavy rainfall and would be "dry" during normal conditions. Since the ponding would only be intermittent, it would not be necessary to remove the majority of the trees or to strip the topsoil south of the subdivision.

2. Construct a diversion ditch around the subdivision in conjunction with a retention pond to be located to the north of the subdivision on lands owned by the County. The diversion ditch would allow the increased flows to bypass the "trouble area" and the retention pond would then control the discharge to protect the downstream areas. The disadvantages connected with this alternative are that:

a. A substantial amount of excavation would be required. Since the test holes have indicated that rock is near the surface in this area, the resulting excavation and rock removal would be quite costly.

b. Some residents have indicated a desire to maintain moderate flow in the existing channel. This would require that special discharge works be constructed at additional expense. Also, the diversion ditch would require deep excavations which might result in rather unsightly conditions.

Our original recommendation had been to locate the facility to the south of Saint Andrews Drive. However, concern over the availability of land coupled with a concern for the trees in that area led to the investigation of the northern location as an alternative.

As a result of these more detailed studies, the economics of the alternatives indicate that the southern location should be reconsidered.

IV RECOMMENDED ALTERNATIVE SOLUTION

It is the recommendation of this office that the Town pursue the possibility of constructing the storm water retention facility south of Saint Andrews Drive using the existing creek bed as the point of discharge from the pond. The estimated cost for this work is $200,000. The facility and flooding area would be on land now owned, or proposed to be purchased, by the County of Monroe.

Representatives of the Monroe County Parks Department have expressed their general approval of this scheme. They did indicate that the responsibility for all construction and future maintenance would rest with the Town of Greece, however.

The most desirable volume of storage based upon a recurrance interval of 50 years is 81 acre feet. The volume of storage at the southern location on the above mentioned Park lands is approximately 81 acre feet and it is felt that this storage would be sufficient to significantly reduce the problems that now exist in the area. Further, the cost estimates of the alternative schemes indicate that the southern location is the only alternative which would

be economically feasible. Further, as additional Park lands are purchased to the south the service spillway and embankment could be raised, thereby providing additional storage capacity. Our recommended design is to provide an embankment to elevation 458 which will permit overflow at elevation 456. These elevations could be increased to 467 and 465, respectively, at some time in the future, should creation of a permanent lake or additional storage be desired.

V COST ESTIMATES

Cost Estimates for the various Alternatives are shown in the Appendices. It will be noted that the cost of the recommended alternative is in line with the original estimates of the 1974 Drainage Study.

It should also be pointed out that the cost of the alternative which would include a Diversion Channel and northside Retention Pond is extremely high because of the amount of earth and rock excavation. We have taken the position that this material would be removed from the site which, of course, substantially increases the cost. Even if the County would permit the depositing of this excavated earth on the Park lands the cost is still excessive far beyond the benefits to be obtained.

This raises the question (as do the remaining alternatives) of the relationship of cost-to-benefit and therefore the following Section VI has been included.

See Appendices for Cost Estimates.

VI COST VS. BENEFIT

An analysis of the cost of the proposed retention facility versus the benefit derived in the immediate vicinity would seem, on the surface, to indicate a poor economic justification for this project. The value of the properties subject to flood damage in the area may not be much higher than the cost of the remedial work necessary to alleviate the problem.

It is our feeling, however, that there are other considerations which should enter into the decision-making which are not strictly economic. For example, construction of the retention facility would result in more "steady" flow in the creek, reduction of erosion all along the length of the stream, reduction of silt deposition in the stream bed and the decrease in the amount of debris travelling downstream; ecological damage would also be minimized.

Although it is difficult to assign cost values to these items, it should be recognized that the proposed project would result in these additional benefits which should be consistent with the goals for long range planning for the Improvement and Protection of Natural Streams in the Town.

VII COMPATIBILITY AND CORRELATION WITH TOWN-WIDE DRAINAGE STUDY

This Natural Stream Improvement and Protection Implementation Project is the first of those recommended under the July 1974 Town-wide Drainage Plan. Consequently it is particularly important to establish how it fits in with the Plan and whether it is following the goals established herein.

Reference is made to the Drainage Study Report, particularly the following:

Section One	-	Page 35, relative to Retention Basins
Section Two	-	Page 164, and following, relative to the St. Andrews Drive problem
Section Three	-	Relative to the Implementation of the Improvement and Protection Program

In summary, the Drainage Study recommends the use of retention basins as a solution to present drainage and flooding problems, and particularly recommends one south of St. Andrews Drive. Further, the Plan recommends that this be undertaken as a "high priority" item. This more detailed study, which included the necessary sub-surface investigation and surveys sees no reason to modify or change those original recommendations.

We conclude that this Proposal is compatible with the master Drainage Plan of 1974. It would also appear that if this project is undertaken with a view towards construction during the 1975 season that the costs will correlate fairly closely with the 1974 Drainage Study.

IT IS IMPORTANT to point out that this proposed basin is to serve the primary function of preventing future flood damage and nuisance to the developed properties in the St. Andrews-Pine Valley-Old Meadow area. It is also to serve the secondary function of reducing peak discharge rates downstream which cause flooding and erosion. HOWEVER, it must be borne in mind that this Retention Basin accommodates only approximately 18% of the entire Larkin Creek watershed (measured at Latta Road Control Point). Consequently its significance as an "anti-flood" device diminishes the further one moves down the watershed to the north. Therefore, to obtain maximum protection benefit from this expenditure it is important that other retention basins be built as development takes place in the Larkin Creek basin and that no building or filling take place within the downstream flood plain.

VIII SCHEDULING

We recognize that certain pressures will be brought to bear on the Town Officials to undertake this project immediately. However, there are certain other factors to consider in establishing a schedule for a project of this nature. Earth dam construction can best be performed when the ground is dry and not frozen - usually between the months of May and December. We would not recommend that an earthwork project of this size be undertaken during the Winter months.

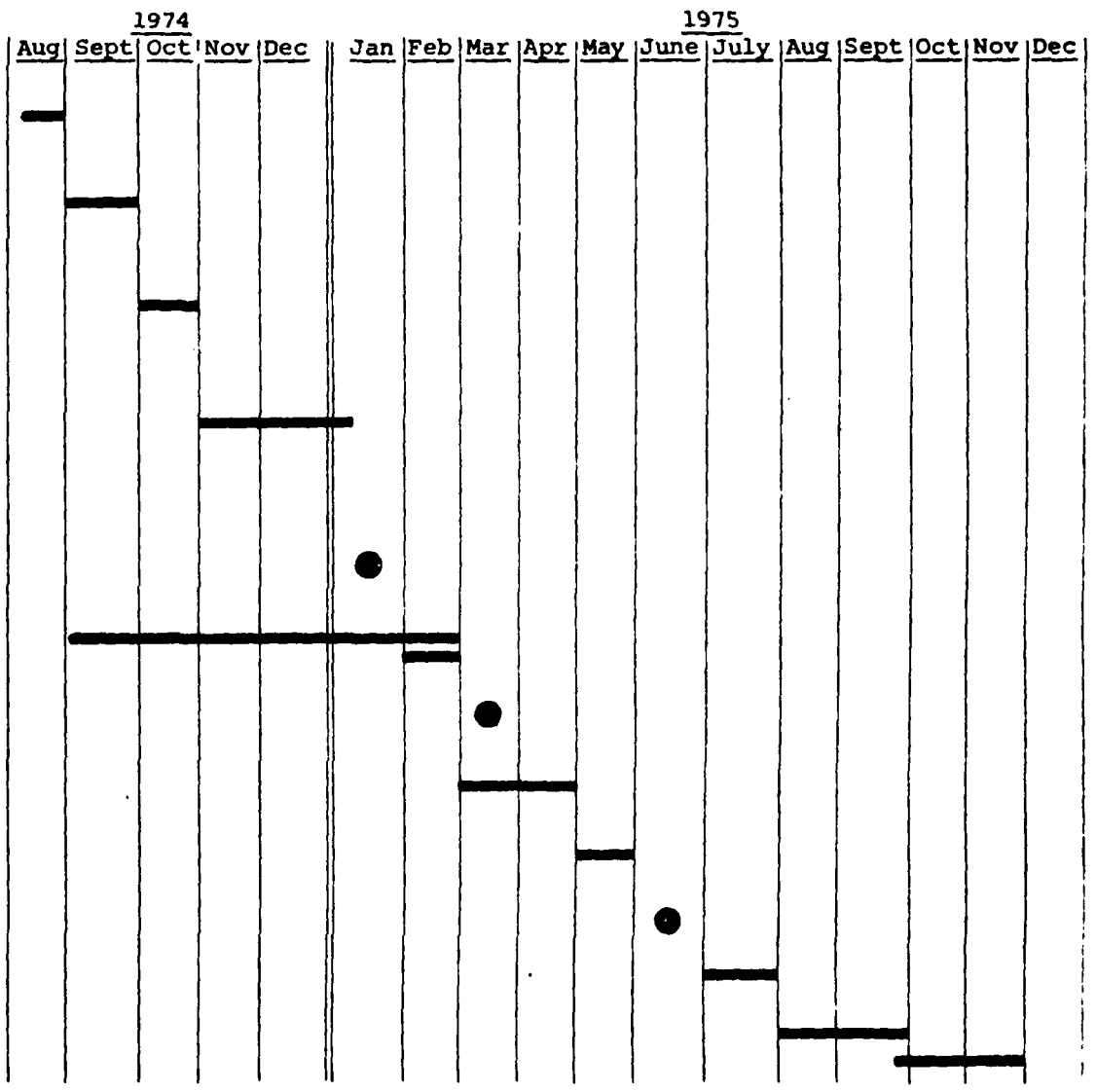
In addition to the time required for the detailed design, bidding and the establishment of financing, time must be allotted for review of the detailed plans and specifications by the Department of Environmental Conservation. We have been advised that this generally takes approximately 60 days.

We bring these items to your attention in order that you will be aware of the time required to implement a project such as this.

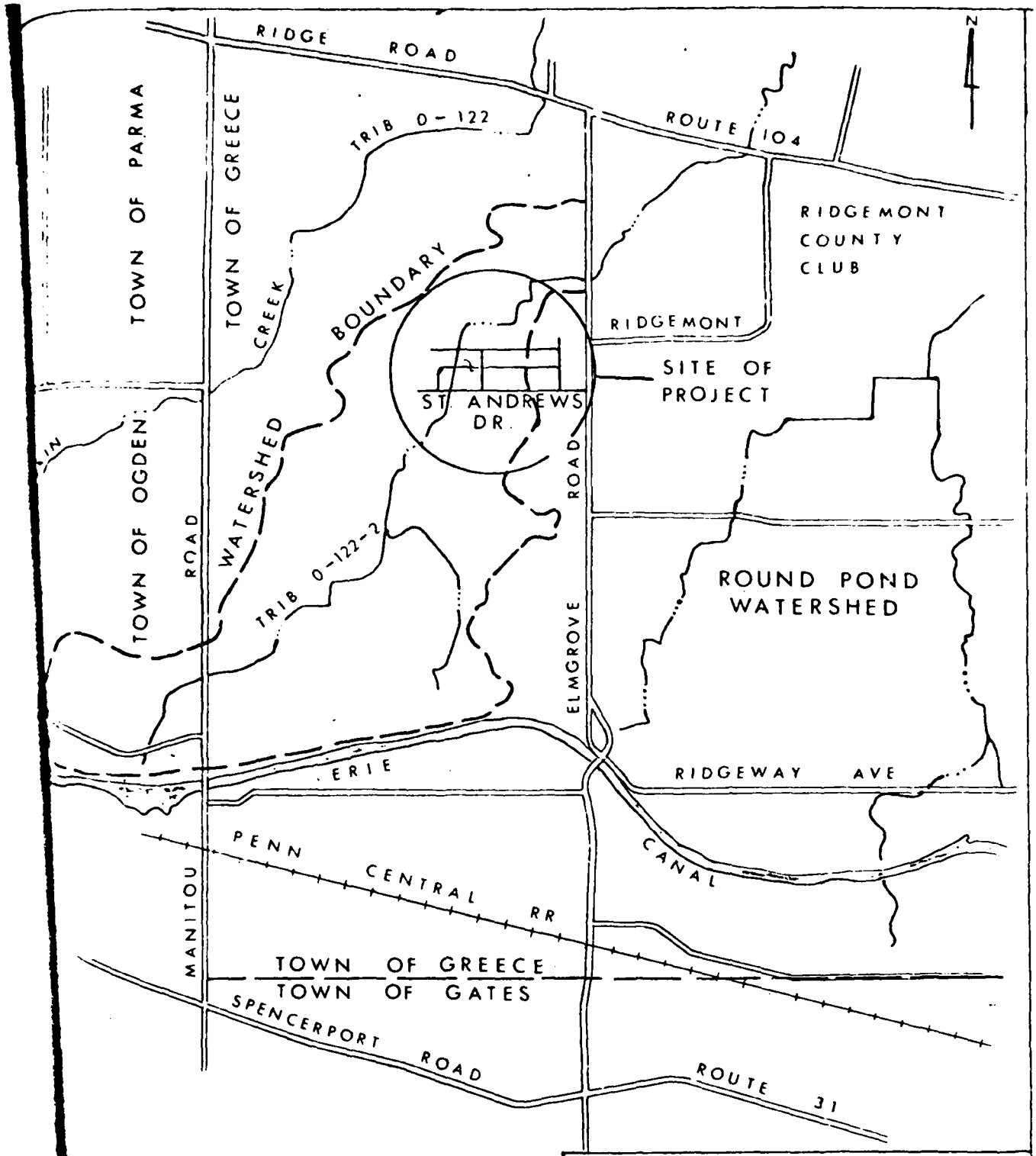
Respectfully submitted,

WCL/pr

William C. Larsen, P.E.


1974
1975
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
June
July
Aug
Sept
Oct
Nov
Dec
Preparation of Preliminary Engineering Report by Consulting Engineer
Review by Town Engineer, Town Board, and Conservation Commission
Report by Finance Committee and Town Attorney relative to financing under Town-wide Drainage District or otherwise
Creation of Town-wide Drainage District, including advertisement, public hearings, approval of financing, and establishment of District....
Authorization to undertake detailed engineering, preparation of plans and specifications
Town-County negotiations
Detailed engineering, plans and specs
Submittal to Town Board
Submittal to DEC for approval under Section 429(c) of the Conservation Law
Advertise for Bids
Award Contract
Construct
Clearing and Grubbing
Earthwork and structures
Seeding & Site Restoration

IX APPENDICES



TOWN OF GREECE NATURAL STREAM IMPROVEMENT AND PROTECTION IMPLEMENTATION PROGRAM

LARKIN CREEK WATERSHED
RETENTION BASIN No. 1

LOCATION PLAN

1974

ENGINEERING DATA SHEET

Allowable discharge through St. Andrews Dr Culvert = 20 cfs

Critical storm duration = 3.5 hours

Required volume of storage = 81 acre-feet

Storage available with dam elevation of 456 = 81 acre-feet

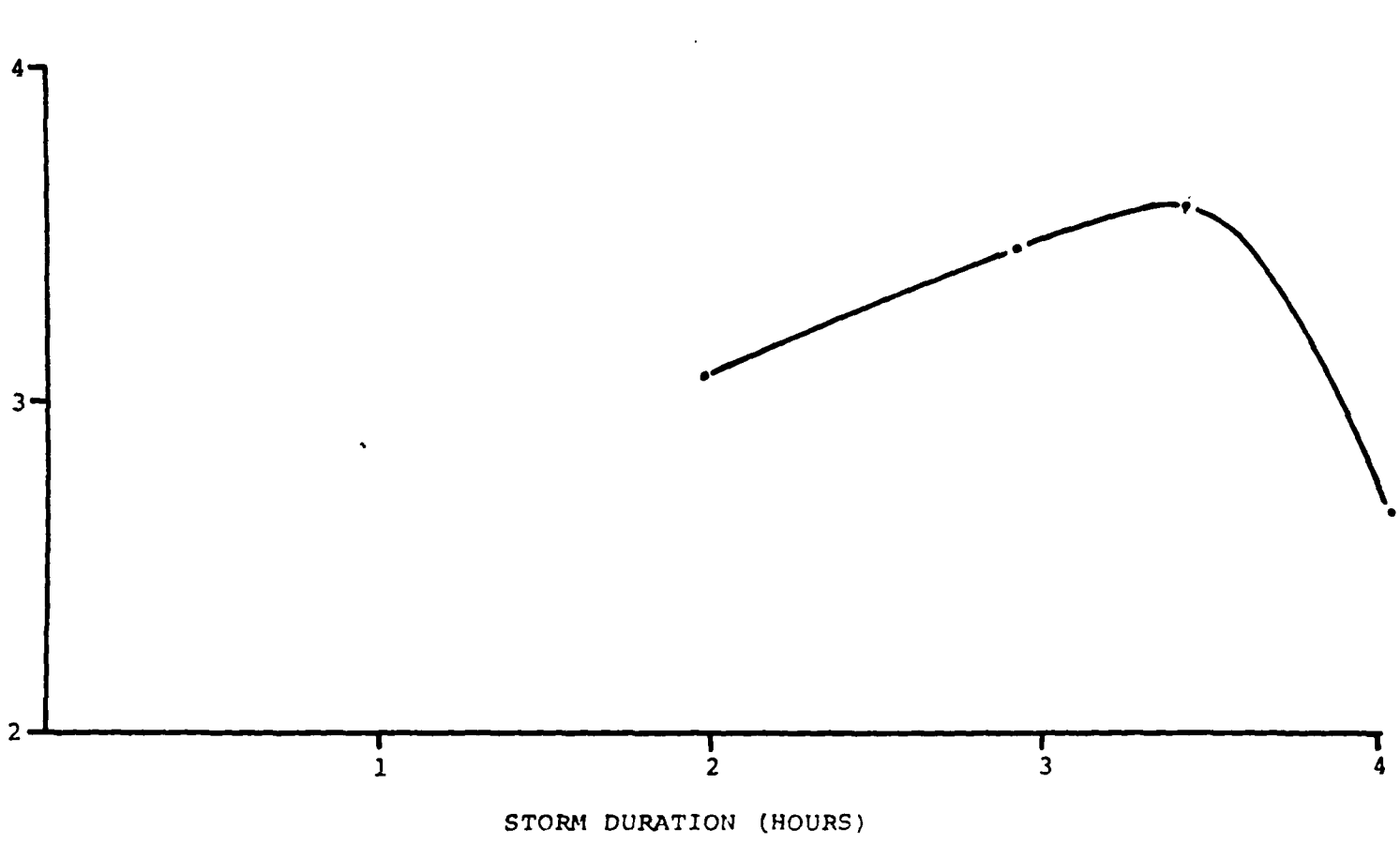
Rainfall Data: Rochester-Monroe County Rainfall Intensity Curves

Runoff Coefficient: .40%

POND SOUTH OF ST. ANDREWS DRIVE

Factors

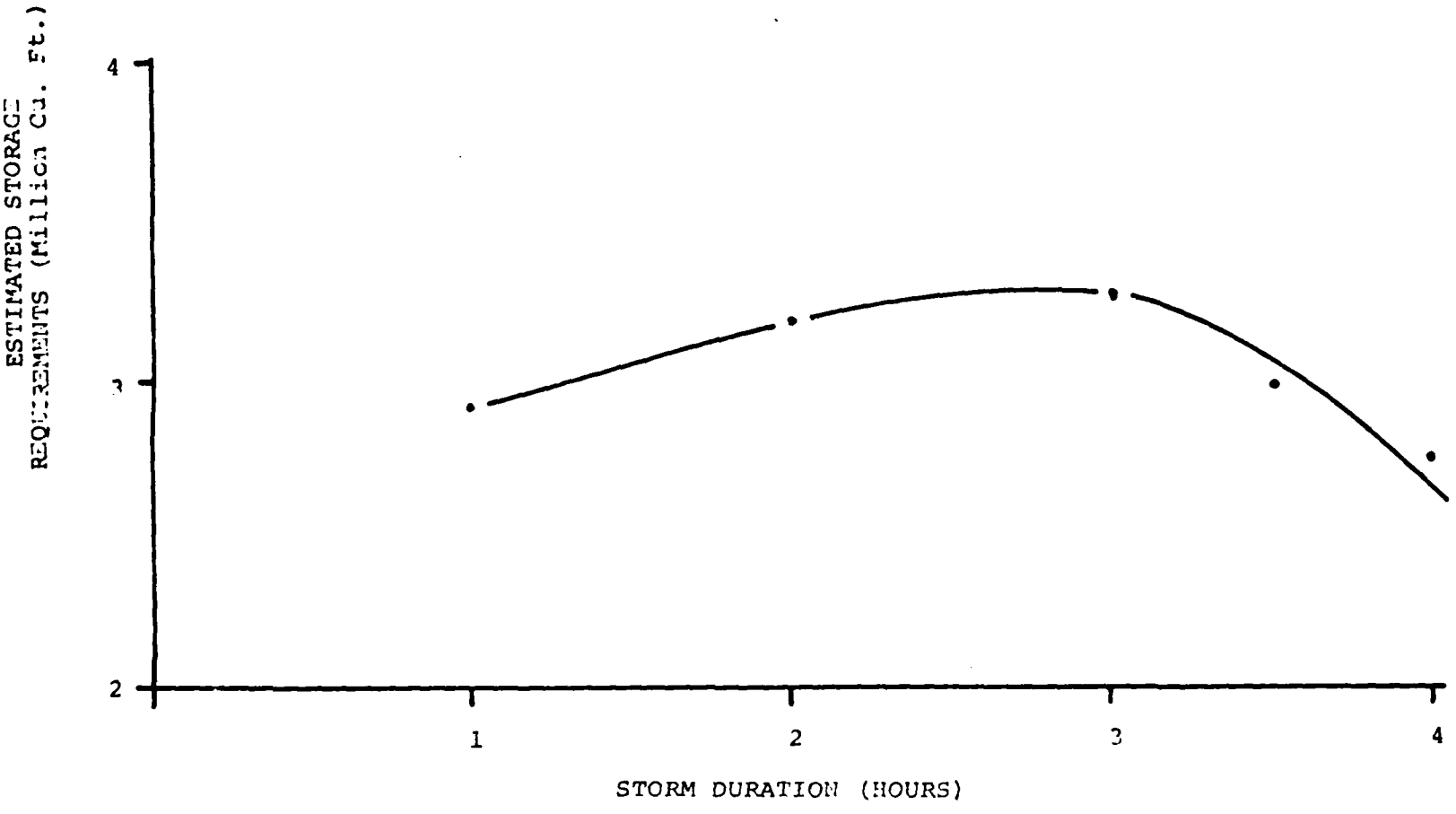
1) Two hour Tc
2) Monroe County 50-yr return interval
3) 0.4 Runoff factor
4) 852 ± Acres
5) Output 20 cfs permitted



ESTIMATED STORAGE REQUIREMENT FOR
POND NORTH OF ST. ANDREWS DRIVE

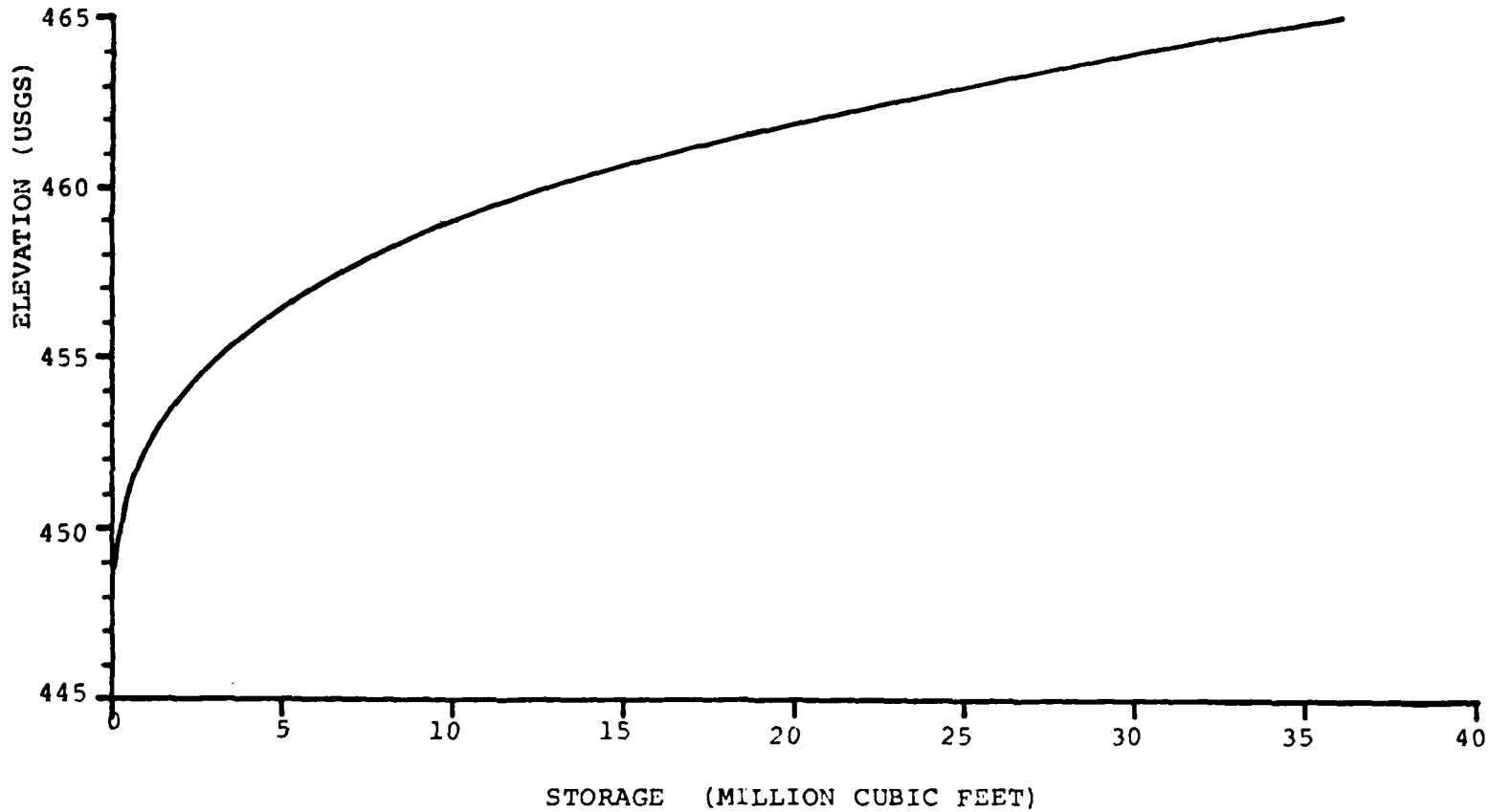
Factors:

1) Two hour Tc
2) Monroe County 50-yr return inter
3) 0.4 Runoff factor
4) 852 + Acres
5) Permitted Output 50 cfs



LARKIN CREEK
RETENTION BASIN NO. 1
ST. ANDREWS DRIVE

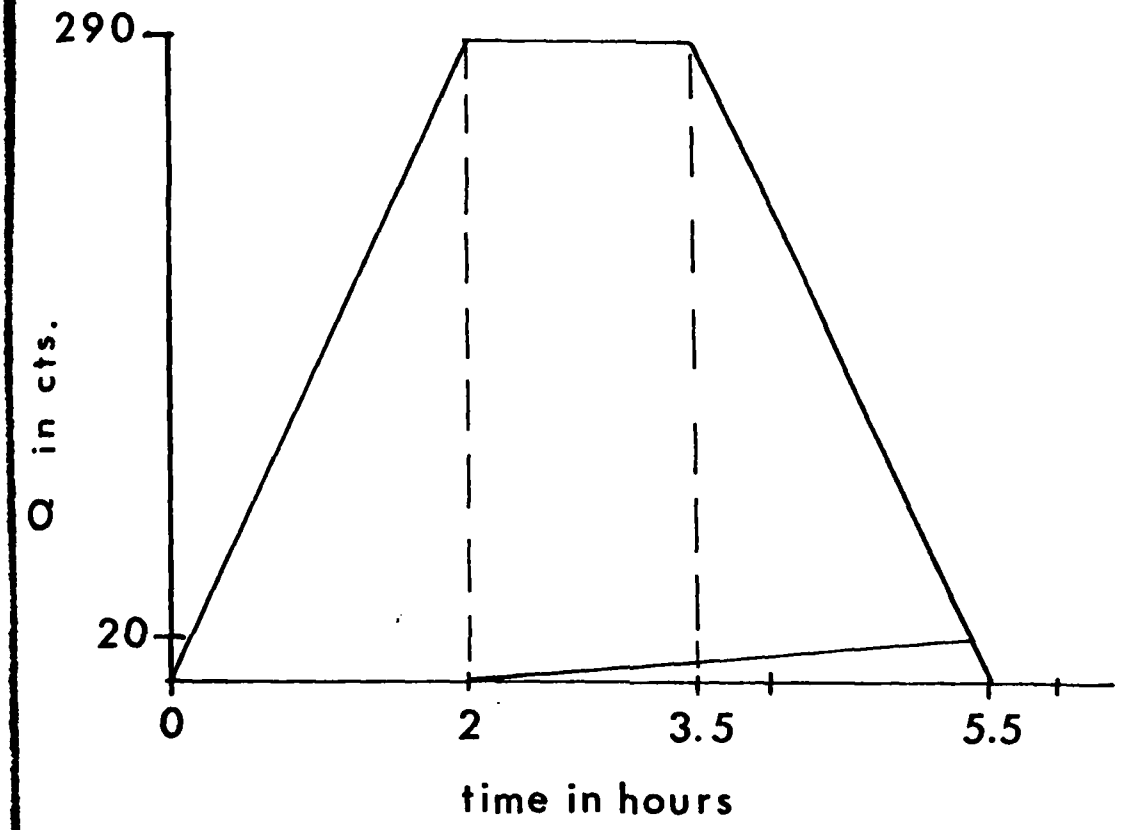
NATURAL POND
APPROXIMATE STORAGE CAPABILITY



Hydrograph

Design Recurrance Interval = 50 years

Storm Duration = 3.5 hours



Volume of Storage required

$V = 2 \times .5 \times 290 \times 2 \times 3600 + 290 \times 1.5 \times 3600 - .5 \times 20 \times 3.5 \times 3600$

$= 2,088,000 + 1,566,000 - 126,000$

$= 3,528,000$ CF $= 81$ Acre feet

LARKIN CREEK
RETENTION BASIN NO. 1
ST. ANDREWS DRIVE

REVISED ENGINEER'S ESTIMATE
RETENTION POND & DISCHARGE STRUCTURE
TO BE LOCATED SOUTH OF SAINT ANDREWS DR.

20,000 CY	Berm Construction	4.00	80,000.
LUMP SUM	Clearing & Grubbing		27,000.
LUMP SUM	Emergency Spillway		20,000.
150 LF	Discharge Piping	20.00	3,000.
LUMP SUM	Riser Section & Headwall		1,000.
LUMP SUM	Grading and Seeding		15,000.
	Estimated Construction Cost		146,000.
	Plus 10% Contingent		14,600.
	Plus 18% Legal, Admin. Eng., Insp.		26,400.
	TOTAL ESTIMATED COST		$187,000.
	Budget figure for Bonding use.....		$200,000.

ENGINEER'S ESTIMATE
DIVERSION DITCH AND RETENTION POND
WITH DISCHARGE STRUCTURE LOCATED NORTH OF
OLD MEADOW DR.

Retention Pond			
4500 CY	Berm construction	4.00	18,000.
171500 CY	Additional earth excavation and disposal of material	6.00	1,029,000.
77000 CY	Rock Excavation	30.00	2,310,000.
LUMP SUM	Emergency Spillway		20,000.
150 LF	Discharge Piping	20.00	3,000.
LUMP SUM	Riser Section & headwall		1,000.
LUMP SUM	Grading & Seeding		15,000.
Diversion Ditch			
103000 CY	Excavation & disposal of material	6.00	618,000.
8800 CY	Rock Excavation	30.00	264,000.
LUMP SUM	Grading and seeding		15,000.
	Estimated Construction Cost		4,293,000.
	10% Contingent		429,300.
	Legal, Admin, Eng., and Inspection		177,700.
	TOTAL ESTIMATED COST.....		$4,900,000.

ENGINEER'S ESTIMATE
HIGHWAY CULVERT REPLACEMENT
AND CHANNEL IMPROVEMENT

NOTE: This Alternate is not recommended because the expenditure of funds does not provide for any protection of the Natural Streams of the Town nor does the solution have any benefit other than the immediate solution to the local problem. Further, and in fact, the flooding problem would simply be transferred downstream and increased erosion would take place as well as other ecological damage.

This alternative consists of the removal of the existing culverts under the three east-west streets and their replacement with concrete box culverts ten feet wide and five feet high. This is necessary to obtain adequate hydraulic capacity without substantially increased upstream ponding elevation. In addition to the culvert construction the channel banks should be stabilized.

3 - 5 x 10 box culverts at $30,000 each including present culvert removal and utility modification as required.....	$90,000.
Stream re-grading, retaining wall construction, and miscellaneous work and restoration.....	80,000.
Estimated construction cost.....	170,000.
Contingent.....	17,000.
Legal, administrative, soils investigations, engineering, inspection and surveys, and contract supervision.....	30,000.
TOTAL ESTIMATED COST.....	$217,000.

PRELIMINARY

SUBSURFACE TEST HOLE LOGS

The following four pages are the logs of the subsurface investigation carried out to determine the location and elevation of bedrock, and to make preliminary determinations as to soil types and groundwater depths.

This was particularly significant in this Study since inordinate amounts of excavation were going to be required if an alternative pond location was to be used north of Old Meadow Drive, and a Diversion Channel built through the high ground to the west of the subdivision.

It will be readily apparent, from the Engineer's Preliminary Estimates included herein, that rock excavation and removal are a substantial part of the total cost.

Test Hole Numbers are for identification purposes and for reference location on the Overall Plan and the 1"=50' scale plans.

TEST HOLE LOG

Hole #1 Station 13+00 Baseline "A" 18' north Elev 443.0

0-1'	topsoil
1'-5½'	reddish brown clay - wet - some sand
	water seepage at moderate rate at 2'
5½'	sandstone can be broken with shovel

Hole #2 Station 17+00 Baseline "A" 26' north Elev 444.5

0-1'	topsoil
1'-6'	reddish brown clay & sand - wet - banks stable
6'	water entering hole fast rate
	hardpan - sandstone hard - not easily broken

Hole #3 Station 20+88 Baseline "A" 12' north Elev 458.0

0-8"	topsoil
8"-2'	light brown reddish sand with very little clay
2'-10½'	sand dry no water seepage easy digging solid banks

Hole #4 Station 24+00 Baseline "A" 18' north Elev 467.5

0-1'	topsoil
1'-9½'	reddish-sand-dry-stable banks
	no seepage into hole - some moisture
9½'-10'	beginning of gravel or broken rock

Hole #5 P.I. 27+13.55 Baseline "A" 17½' west Elev 468.5

0-1½'	topsoil
1½'-7'	dry sandy brown soil - no water seepage
7'-9'	(hard digging) sandstone very hard

Hole #6 Station 30+0 Baseline "A" 12' west Elev 461.5

0-10" topsoil
10"-3' sandy soil brown damp
3'-11' medium reddish brown clay soil-damp
no water seepage, also some small rock fragment
easy digging - banks are stable

Hole #7 Station 34+0 Baseline "A" 15½' west Elev 462.0

0-10" topsoil
10"-2½' sandy reddish loam
2½'-11½' moist sand having some clay
stable banks, no visual seepage of water, easy digging

Hole #8 Station 40+00 Baseline "A" 17½' west Elev 451.5

0-1' topsoil
1'-8' clay reddish moist consistency
8'-11' beginning layer of sandstone - can be broken
water seepage at 8' level

Hole #9 Station 40+00 Baseline "A" 450'± west Elev 453.0
(corner of first hedge now running north-south)

0-1' topsoil - black
1'-2½' moist brown reddish sand
2½'-4½' gravel layer moderate to excessive seepage of water
at this level
4½'-11' clay - gravely sand loam - moisture wet

Hole #10 Station 42+00 445' west 58' south section running west
Elev 455.0

0-1' topsoil
1'-11' moist clay - solid banks - no water seepage, easy digging.

Hole #11 Station 46+00 198' west & 10' south Elev 453.0

0-10"	topsoil
10"-9½'	hard clay, very hard banks, no water seepage, very dry

Hole #12 Station 1+51 Baseline "B" going north Elev 438.5

0-10"	topsoil
10"-6½'	moist clay brown loam solid banks dry - no water seepage

Hole #13 Station 5+42 Baseline "B" going north Elev 436.5

0-10"	topsoil
10"-5½'	red sandstone (very hard) and some sand, little clay can break with shovel. Top of hardpan starts at 5½' slight water seepage noticable.

Hole #14 Station 5+59 Baseline "D" going north Elev 440.0

0-8"	topsoil
8"-1½'	sandy loam
1½'-8½'	small amount of clay - reddish sandstone in horizontal layers very hard - not easily excavated top of hardpan at 8½' - moderate water seepage at 8½'

Hole #15 Station 3+52 Baseline "D" going north Elev 439.0

0-8"	topsoil
8"-8½'	hard reddish sandstone with sand in horizontal layers - hard going for tractor backhoe
8½'	moderate water seepage - moist to wet earth

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

Subsurface Investigations,
Larkin Creek Retention Facility,
Project No. 76924

Monroe County Department of Public Works
350 East Henrietta Road
Rochester, New York 14620
Attn: Mr. Raymond Keefe

ROCHESTER DRILLING COMPANY, INC.
45 Steel Street
Rochester, New York 14606

Carl J. Asprinio, President

April 28, 1976

Job No. 1622

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

April 28, 1976
Job No. 1622

Monroe County Department of Public Works
350 East Henrietta Road
Rochester, New York 14620

Attention: Mr. Raymond Keefe

Re: Subsurface Investigations,
Larkin Creek Retention Facility,
Project No. 76924

Gentlemen:

The field and laboratory examinations for the project referenced above have been completed. The test borings were begun on April 22, 1976 and were terminated on April 23, 1976. At this time a total of six (6) test holes were explored to specified depths, as indicated by Monroe County Department of Public Works.

Method

The method and procedure followed in making these test borings were in accordance with plans and specifications outlined by Monroe County Department of Public Works. The boring machine used was a C.M.E. 550 an all-terrain type drilling rig. Standard sampling was accomplished utilizing a 2½ inch hollow stem auger casing and a two (2) inch extra heavy duty split spoon sampler. Standard penetration sampling was made using a 140 pound hammer dropping 30 inches each blow, (A.S.T.M. D-1586). It should be noted that no water was induced into the test hole for drilling purposes except for core drilling rock.

Material Encountered

The material encountered was generally a sandy silt or silty fine sand with varying amounts of gravel overlying a reddish brown silt with varying amounts of fine sand and gravel, trace of shale fragments.

Location

The location of all test holes was made in the field by Monroe County Department of Public Works.

Water Levels

The water levels were observed at completion of each test hole with the casing in and out of the boring hole. It should be noted that seasonal and climatic changes will alter the observed water levels.

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

Classification

The classification of samples was first made in the field by the foreman, Mr. James Hammond. He then forwarded the samples and the field logs to our laboratory to be visually checked by our soil technicians.

Samples

The soil and rock samples have been forwarded to the office of County of Monroe, Department of Public Works, 350 E. Henrietta Rd.

If you have any questions please contact me at your earliest convenience.

Yours very truly,

ROCHESTER DRILLING COMPANY, INC.

Carl J. Asprinio dj

Carl J. Asprinio
President

CJA/dj

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

BORING TERMS AND SYMBOLS

N	The number of blows from a 140 pound hammer falling 30 inches needed to drive a split-spoon sampler the last 12 inch penertration of the sample.
C	The number of blows from a 300 pound hammer falling 24 inches needed to drive casing 12 inches.
100/1 inch	Number of blows needed to drive sampler or casing the distance shown. Used for indicating refusal.
WR	Sampler advanced by the weight of rods only, indicating very soft material.
WH	Sampler or casing advanced by weight of hammer only, indicating very soft material.
ST	Shelby Tube Sample (piston sample or pressed tube sample).
CS	Continuous sampling
AX	1 1/8" rock core
BX	1 5/8" rock core
NX	2 1/8" rock core
75%	Percentage of rock core recovered
P.L.	Plastic limit
L.L.	Liquid limit
M.C.	Moisture content--Dry, Damp, Moist, Wet, Saturated
H.C.	Boring caved after casing or augers were removed

Note:

WE CANNOT BE RESPONSIBLE FOR INTERPRETATIONS OR OPINIONS MADE BY OTHERS FROM THE ENCLOSED DATA.

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

Refusal — Depth in boring where more than 150 blows per foot are needed to advance the sample spoon.

Cohesive Soil — Very fine grain soils with appreciable dry strength. Plastic--can be rolled into a thin thread when damp with no apparent water movement. Clays and silty to sandy clays show cohesion.

Description	Penetration Resistance Blows/Foot
Very Soft	0-2
Soft	3-5
Medium	6-15
Stiff	16-25
Hard	26 of more

Non-Cohesive Soil — Soils composed of silt, sand, and gravel, show no cohesion and only slight plasticity.

Description	Penetration Resistance Blows/Foot
Loose	0-10
Firm	11-25
Compact	26-40
Dense	41-50
Very Dense	51 or more

Composition	Estimated Percentage
And	50
Some	30-49
Little	11-29
Trace	0-10

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

PROJECT NO. 1622 PAGE 1 OF 1 BORING NO. B-1

PROJECT Larkin Creek Retention Facility - Project No. 76924

CLIENT County of Monroe, Dept. of Public Works

ELEVATION 419.65 INSPECTOR WEATHER

DATE STARTED 4-23-76 COMPLETED 4-23-76 TECHNICIAN J. Hammond

GROUND WATER – CASING IN – AT COMPLETION / TIME

BELOW SURFACE – CASING OUT – 3'8" 4-23-76 -WELLPOINT AT

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		1	1			2			
				1	1	2	1	0'0"-2'0"	Very loose brown wet silt, little fine sand, little coarse sand and fine gravel, trace of organic material. 4'0"
5		4	3	5		8	2	4'0"-5'6"	Loose brown saturated fine sand and silt, little fine gravel, trace of organic material. 7'0"
		32	40	48		88	3	8'0"-9'6"	Very dense reddish brown moist silt, little fine gravel, trace of fine sand.
10									Very dense reddish brown moist silt, little fine gravel, trace of fine sand, many shale fragments noted. 12'9"
		64	100 3"			164 9"	4	12'0"-12'9"	Weathered and decomposed shale and shale fragments. 13'6"
15									BORING TERMINATED AT 13'6" (Refusal)
									Note: Advanced test boring with hollow stem auger casing to 13'6".

NOTES: N = NO OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB WT 30" EA BLOW
C = NO OF BLOWS TO DRIVE CASING WITH LB WT EA BLOW

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

PROJECT NO. 1622 PAGE 1 OF 1 BORING NO. B-2

PROJECT Larkin Creek Retention Facility, Project No. 76924

CLIENT County of Monroe, Dept. of Public Works

ELEVATION 418.97 INSPECTOR WEATHER

DATE STARTED 4-23-76 COMPLETED 4-23-76 TECHNICIAN J. Hammond

GROUND WATER BELOW SURFACE – CASING IN – 10'0" – CASING OUT – 6'1" AT COMPLETION / TIME 4-23-76 – WELLPOINT AT

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION / REMARKS
		12				1			Very loose brown wet silt, little fine gravel and sand, trace of organic material.
				1		1	1	0'0"-2'0"	
				12					
5		1	1	2		3	2	4'0"-5'6"	Very loose brown wet silt, little fine gravel and sand, trace of organic material. 5'0"
									Loose brown wet fine sand and silt, little fine gravel. 7'6"
		42	47	55		102	3	8'0"-9'6"	Very dense reddish brown damp silt, little fine gravel, trace of sand.
10									Very dense reddish brown damp silt, little fine gravel, trace of sand, many shale fragments noted.
		100/5"				100/5"	4	12'0"-12'5"	Refusal 14'6"
								Run #1 14'6"-19'6" Rec.3'5"	Medium hard red with gray mottled fine grained sandstone with few shale partings to soft red shale at 19'0". Core in many pieces from chips to 3" long.
15									
20									19'6"
									BORING TERMINATED AT 19'6"
									Note: Advanced test boring with hollow stem auger casing to 14'6". Core drilled with AX Series "M" double tube core barrel and diamond bit from 14'6"-19'6".

NOTES: N = NO OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB WT 30" EA BLO
C = NO OF BLOWS TO DRIVE CASING WITH LB WT EA BLO

ROCHESTER DRILLING COMPANY, INC.

CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

PROJECT NO. 1622 PAGE 1 OF 1 BORING NO. B-3

PROJECT Larkin Creek Retention Facility, Project No. 76924

CLIENT County of Monroe, Dept. of Public Works

ELEVATION 415.60 INSPECTOR WEATHER

DATE STARTED 4-23-76 COMPLETED 4-23-76 TECHNICIAN J. Hammond

GROUND WATER BELOW SURFACE – CASING IN – AT COMPLETION / TIME

– CASING OUT – Top of boring is 0'6" below water surface. – WELLPOINT AT

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		1	17			18			
				6	1	7	1	0'0"-2'0"	Loose brown wet coarse to fine sand and silt, little coarse to fine gravel, trace of organic material.
									3'6
5		25	36	44		80	2	4'0"-5'6"	Very dense reddish brown damp silt, little fine gravel, trace of sand.
		69	76	98		174	3	8'0"-9'6"	Very dense reddish brown damp silt, little fine gravel, trace of sand.
10									
									Very dense reddish brown damp silt, little fine gravel, trace of sand. 12'6
		100/2"				100/2"	4	12'0"-12'2"	
									BORING TERMINATED AT 12'6" (Refusal)
15									
									Note: Advanced test boring with hollow stem auger casing to 12'6".

NOTES: N = NO OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB WT 30" FA BI
C = NO OF BLOWS TO DRIVE CASING WITH LB WT EA BI

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

PROJECT NO. 1622 - PAGE 1 OF 1 BORING NO. B-4

PROJECT Larkin Creek Retention Facility, Project No. 76924

CLIENT County of Monroe, Dept. of Public Works

ELEVATION 415.22 INSPECTOR WEATHER

DATE STARTED 4-23-76 COMPLETED 4-23-76 TECHNICIAN J. Hammond

GROUND WATER BELOW SURFACE – CASING IN – AT COMPLETION / TIME
– CASING OUT – Top of boring is 1'0" below water surface. -WELLPOINT AT

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		1	2			3			
				4	4	8	1	0'0"-2'0"	Loose brown saturated silt and coarse to fine sand, little fine gravel, trace of organic material. 3'6"
5		25	39	52		91	2	4'0"-5'6"	Very dense reddish brown fine sand and silt, trace to little fine gravel.
		100/4"				100/4"	3	8'0"-8'4"	Very dense reddish brown silt, little gravel, trace of sand.
10									
		100/1"				100/1"	4	12'0"-12'1"	Reddish brown shale and sandstone fragments 12'6"
15									BORING TERMINATED AT 12'6" (Refusal)
									Note: Advanced test boring with hollow stem auger casing to 12'6".

NOTES: N = NO OF BLOWS TO DRIVE 2" SPOON 12" WITH 1-[illegible] LB WT 30" EA BLO
C = NO OF BLOWS TO DRIVE ____ CASING ____ WITH ____ LB WT ____ EA BLO

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

PROJECT NO. 1622 PAGE 1 OF 1 BORING NO. B-5

PROJECT Larkin Creek Retention Facility, Project No. 76924

CLIENT County of Monroe, Dept. of Public Works

ELEVATION 415.95 INSPECTOR ____ WEATHER ____

DATE STARTED 4-22-76 COMPLETED 4-22-76 TECHNICIAN J. Hammond

GROUND WATER BELOW SURFACE – CASING IN – ____ AT COMPLETION / TIME ____
– CASING OUT – Boring is 0'6" below water surface -WELLPOINT AT ____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		5	6	9		15	1	1'0"-2'6"	Firm brown saturated coarse to fine sand and fine gravel, little silt. Cobbles from 4'0"-4'6" noted.
5			70						
				60	48	108	2	4'6"-6'0"	Very dense reddish brown silt, some fine gravel and coarse sand, trace medium to fine sand. 8
		37	100			137	3	8'0"-8'9"	Very dense reddish brown silt and sh fragments.
10			3"			9"			Shale fragments and weathered and decomposed shale (refusal) 12'
								Run #1 12'6"-17'6" Rec. 2'6"	Medium hard red with gray mottled fi grained sandstone with few to many soft shale partings. Core in man pieces from chips to 3" pieces. 17
15									BORING TERMINATED AT 17'6"
20									Note: Advanced test boring with hol stem auger casing to 12'6". Core drilled with AX Series " double tube core barrel and diamond bit from 12'6" to 17'

NOTES: N = NO OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB WT 30" EA B
C = NO OF BLOWS TO DRIVE ____ CASING ____ WITH ____ LB WT ____ EA B

ROCHESTER DRILLING COMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

PROJECT NO. 1622 PAGE 1 OF 1 BORING NO. B-6

PROJECT Larkin Creek Retention Facility, Project No. 76924

CLIENT County of Monroe, Dept. of Public Works

ELEVATION 917.72 INSPECTOR WEATHER

DATE STARTED 4-22-76 COMPLETED 4-22-76 TECHNICIAN J. Hammond

GROUND WATER - CASING IN - AT COMPLETION / TIME

BELOW SURFACE - CASING OUT - 10'3" 4-22-76 -WELLPOINT AT

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	18"/24"	N	SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		1	1			2			
				1	1	2	1	0'0"-2'0"	Very loose brown damp silt and fine sand, little fine gravel, trace of organic material. 3'6"
5		18	21	21		42	2	4'0"-5'6"	Dense brown damp fine sand and silt, little medium to fine gravel, trace coarse sand.
		37	46	48		94	3	8'0"-9'6"	Very dense reddish brown silt, some medium to fine gravel and shale fragments.
10									Shale fragments and weathered and decomposed shale. Refusal 12'6"
		100/1"				100/1"	4	12'0"-12'1" Run #1 12'6"-17'6" Rec. 2'5"	Medium hard red/gray mottled fine grained sandstone with few shale partings to soft red shale at 15'0". Core in many pieces from chips to 3" pieces. 17'6"
15									
20									BORING TERMINATED AT 17'6"

Note: Advanced test boring with hollc stem auger casing to 17'6".

Core drilled with AX Series "M' double tube core barrel and diamond bit from 12'6" to 17'6"

Boring location moved 2' South and 2' West from original stake location to avoid underground R.G.&E. 8" gas main.

NOTES: N = NO OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB WT 30" EA. BLO
C = NO OF BLOWS TO DRIVE CASING WITH LB WT EA. BLO

the office of james p. collins, p.e.

474 THURSTON RD., ROCHESTER, N.Y. 14619 / 716-235-8372
CONSULTING GEOTECHNICAL ENGINEERS

September 22, 1975

William C. Larsen, P.E.
44 Saginaw Drive
Rochester, New York 14623

Attention: Mr. Dale Green, P.E.

Reference: AN RET P, 2330.00

Regarding: Embankment Realignment

Gentlemen:

This letter is an addendum to our Larkin Creek Storm Water Detention Pond Report dated June 30, 1975. The east end of the embankment has been moved about 200 feet south. The original test pits were close to this alignment; however, we were interested in fall water table information and we arranged for 4 more test pits.

The new test pits, numbered TP-101 through TP-104, were excavated with a case 580 backhoe on September 10, 1975. We collected soil samples and logged the test pits. The test pit logs, a revised centerline profile, and a revised location plan are attached for inclusion in our earlier report.

The soils are the same and confirm our original profile. The site is much drier now than last spring when the first test pits were excavated. We do not think the

extensive dew ring we first recommended will be necessary if the dam is built during the late summer or early fall. All other recommendations from our June 30, 1975, report remain in effect.

If you have any questions, please call.

Very truly yours,

JAMES P. COLLINS, P.E.

John Harnly

John R. Harnly, P.E.

JRH:gis

enc: 8 copies, Test Pit Logs
8 copies, Revised Soil Profile
8 copies, Revised Location Plan

the office of james p. collins, p.e.

474 THURSTON RD., ROCHESTER, N.Y. 14619 / 716-235-8372
CONSULTING GEOTECHNICAL ENGINEERS

September 22, 1975

William C. Larsen, P.E.
44 Saginaw Drive
Rochester, New York 14623

Attention: Mr. Dale Green, P.E.

Reference: AN RET P, 2330.00

Regarding: Cutoff Trench

Gentlemen:

This is to confirm our discussion of a week ago in your office on the need to add a cutoff trench to the Larkin Creek Storm Water Detention Pond. We do not believe this is necessary for the integrity of the dam, nor will its omission jeopardize the safety of the embankment. We do recommend that a cutoff be placed in the west embankment as stated in our report. We also reiterate our request that a geologist or soils engineer examine the foundation after stripping to check for irregularities or sand lenses. If clean sand or gravel is found, we recommend a cutoff of the affected zone.

If you have further questions, please call.

Very truly yours,

JAMES P. COLLINS, P.E.

John Harnly

John R. Harnly, P.E.

JRH:gis

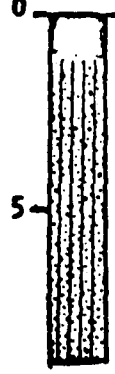
jpc

LOG OF TEST PIT

No. TH-101

ST ANDREW'S DRIVE STORM
WATER RETENTION POND

DEPTH(ft) ELEVATION DATE 9/10/75



1.0 ft. TOPSOIL.

SM Dense, red, fine to coarse SAND and SILT, little gravel and cobbles, moist, non-plastic, GLACIAL TILL.

Bottom of hole 9 ft.

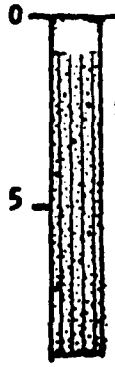
Note: No bedrock encountered.
No water in hole.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

LOG OF TEST PIT

No. TH-102

DEPTH(ft) ELEVATION DATE 9/10/75



1.0 ft. TOPSOIL.

SM Dense, red, fine to coarse SAND and SILT, some gravel and cobbles, moist, non-plastic, GLACIAL TILL.

Bottom of hole 9 ft.

Note: No bedrock encountered.
No water in hole.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

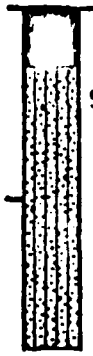
jpc

LOG OF TEST PIT

No. TH-103

ST. ANDREW'S DRIVE STORM
WATER RETENTION POND

DEPTH(ft) | ELEVATION | DATE 9/10/75



1.2 ft. TOPSOIL.

SM Dense, red, fine to coarse SAND and SILT, little gravel and cobbles, damp, non-plastic, GLACIAL TILL.

Grading to moist.

Grading to wet.

Grading to some boulders.

Bottom of hole 9 ft.

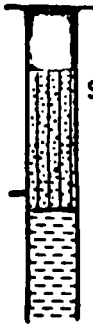
Note: No water encountered.
No bedrock encountered.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

LOG OF TEST PIT

No. TH-104

DEPTH(ft) | ELEVATION | DATE 9/10/75



1.5 ft. TOPSOIL AND ROOTS.

SM Dense, red, fine to coarse SAND and SILT, some gravel, cobbles and boulders, moist, non-plastic, GLACIAL TILL.

Top of rock 5.5 ft.

Bottom of hole 5.5 ft.

Note: Some seepage of water from layer just above rock.
2" of water in bottom of hole after 10 minutes.

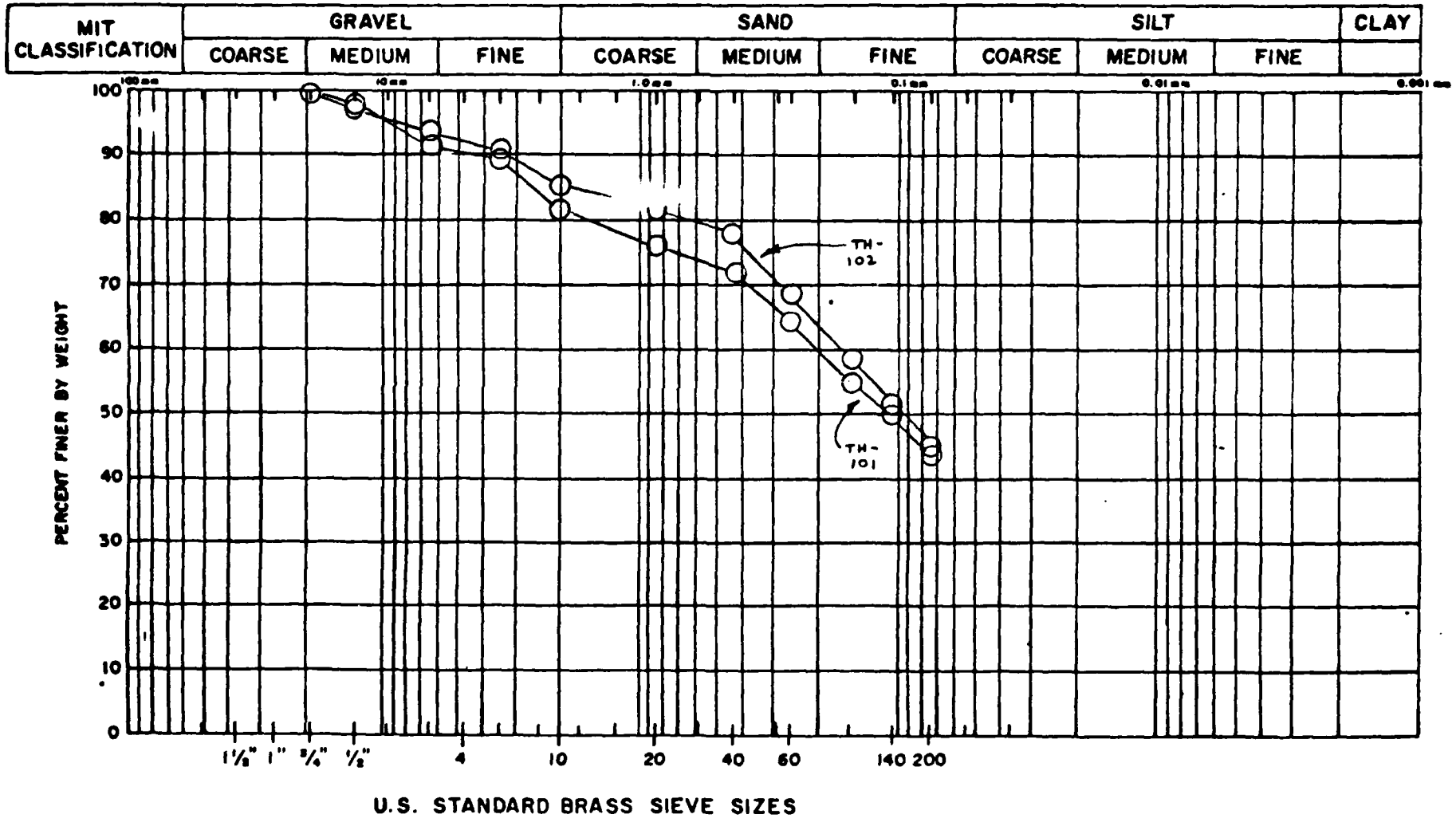
The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

GRAIN SIZE DISTRIBUTION

PROJECT AN RET P. 2330.00

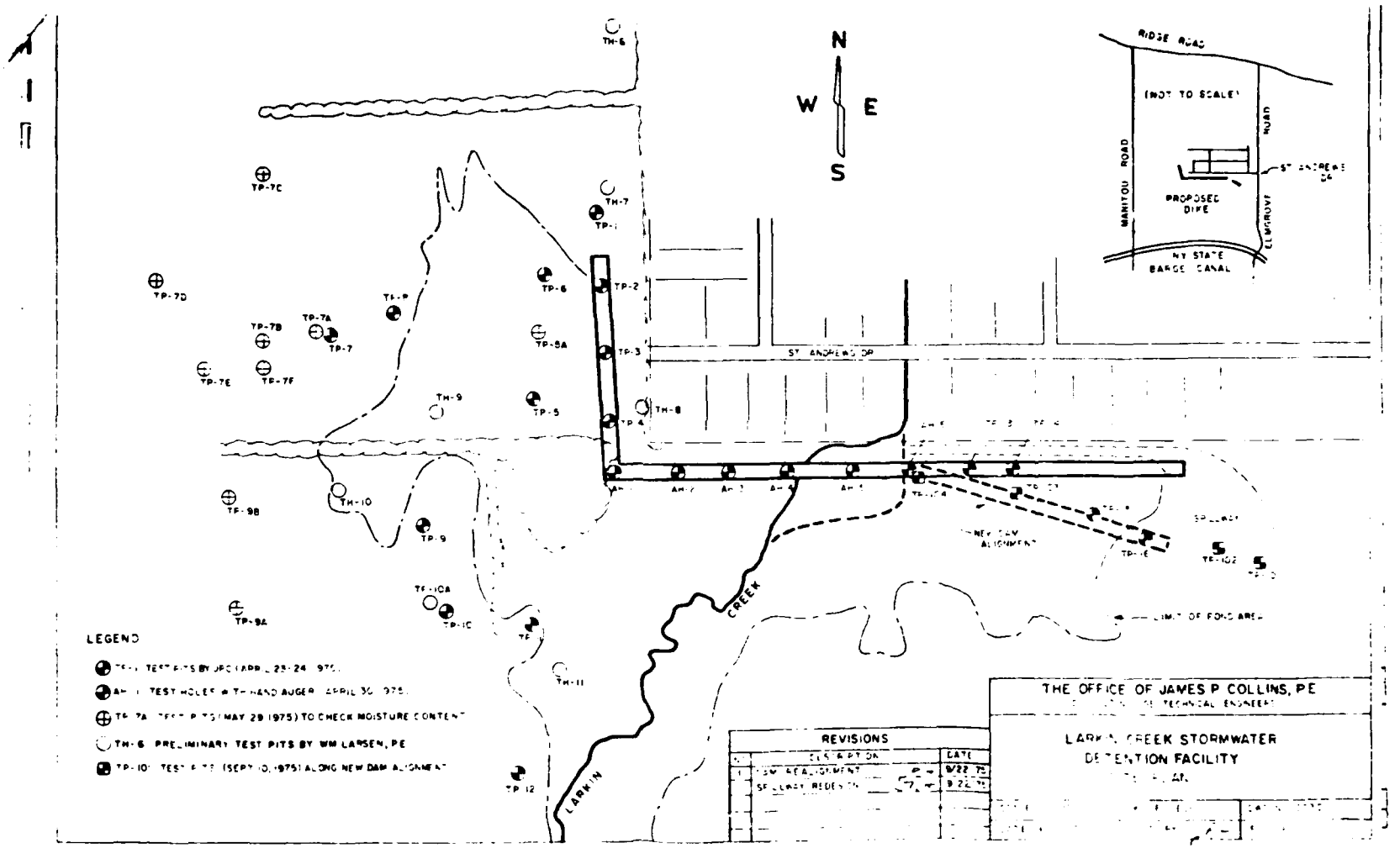
BORING NO. TH-101 DEPTH 4' TEST BY C. Timko REMARKS SHEET No. ____ OF ____

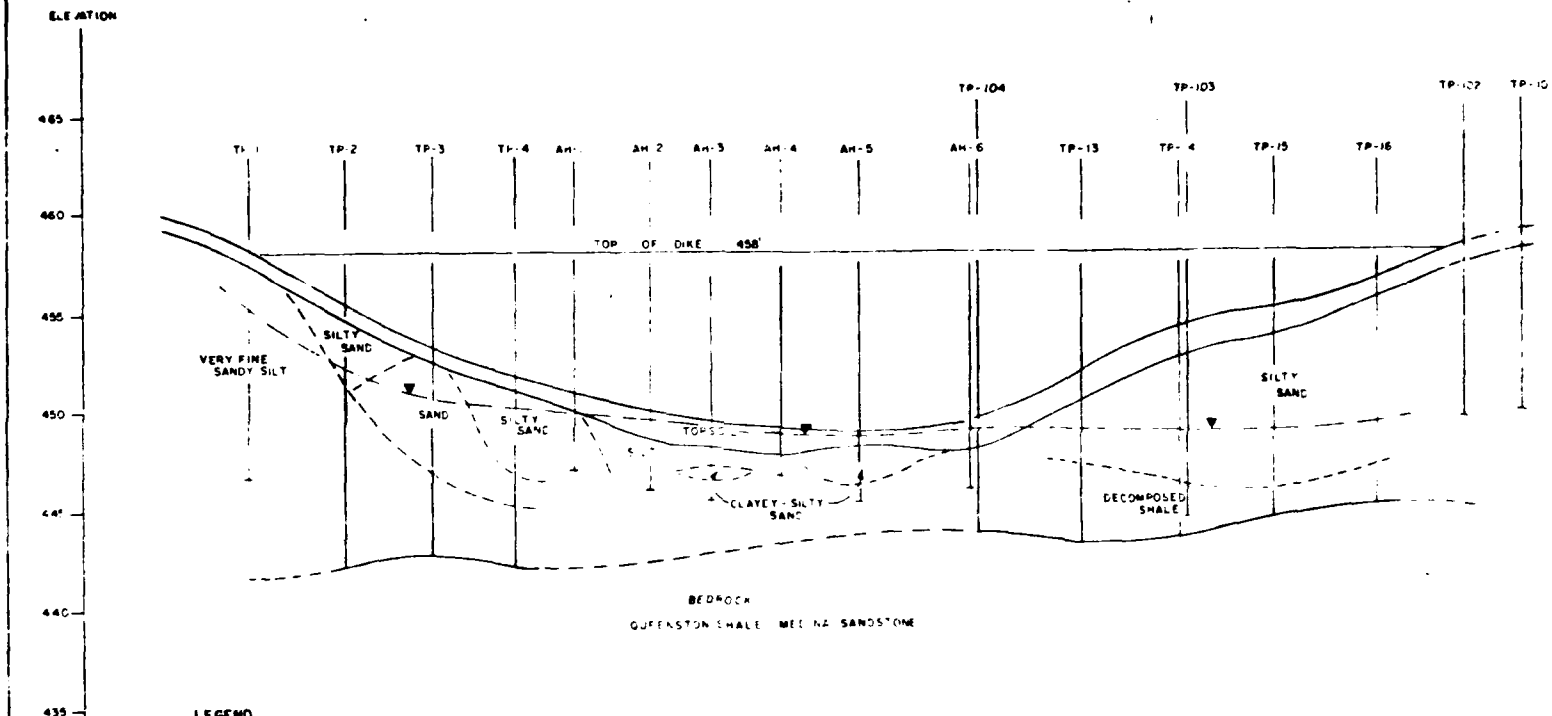
BORING NO. TH-102 DEPTH 1' DATE 9/13/75



Form No. 14-70

JAMES R COLLINS & ASSOCIATES
CONSULTING SOILS AND FOUNDATION ENGINEERS


N
W
E
S
RIDGE ROAD
(NOT TO SCALE)
MANITOU ROAD
PROPOSED DIKE
NY STATE BARGE CANAL
ST. ANDREWS DR.
TH-6
TP-7C
TH-7
TP-1
TP-7D
TP-6
TP-2
TP-7B
TP-7A
TP-7
TP-8A
TP-3
TP-7E
TP-7F
TH-9
TP-5
TH-8
TP-4
TP-8B
TH-10
TP-9
TP-10A
TP-10C
TP-8A
TH-11
TP-12
LARKIN
CREEK
NEW DAM ALIGNMENT
SPILLWAY
LIMIT OF FLOOD AREA
LEGEND
TH-6 PRELIMINARY TEST PITS BY WM LARSEN, PE
REVISIONS
DESCRIPTION
DATE
THE OFFICE OF JAMES P COLLINS, PE
LARKIN CREEK STORMWATER
DETENTION FACILITY



LEGEND

TP-1 TEST PITS BY JPC (APRIL 23-24 1975)
AH-1 TEST HOLES BY HAND AUGER (APRIL 30 1975)
TP-101 TEST HOLES ALONG NEW DAM ALIGNMENT (9/10/75)
SEE SITE PLAN FOR REVISIONS (9/22/75)

NOTE THIS PROFILE WAS DEVELOPED BY INTERPOLATION BETWEEN WIDELY SPACED TEST HOLES IT IS OUR INTERPRETATION OF SOIL AND ROCK CONDITIONS, HOWEVER, SOIL CONDITIONS MAY VARY BETWEEN TEST HOLES

TEST HOLE LOCATIONS ARE APPROXIMATE SEE SITE PLAN FOR LOCATIONS

SCALE
HORIZ 1"=200'
VERT 1"=5'

APPROXIMATE GROUNDWATER TABLE (MEASURED APRIL 1975)
HIGH SEASONAL FLUCTUATION CAN BE EXPECTED IN THIS AREA

REVISED 9/22/75

THE OFFICE OF JAMES P. COLLINS, PE
CONSULTING GEOTECHNICAL ENGINEERS

LARKIN CREEK STORMWATER DETENTION FACILITY

DAM CENTERLINE - SOIL PROFILE

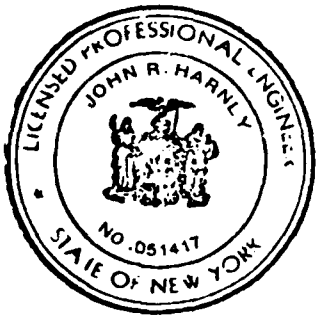
SCALE AS SHOWN	DWN BY EJH	JOB NO. 7550
DATE 8/30/75	CHKD BY JPC	FILE

LARKIN CREEK STORMWATER DETENTION FACILITY SOILS REPORT

FOR

WILLIAM C. LARSEN, P.E.
AND
TOWN OF GREECE, NEW YORK

BY: John R Harnly
JOHN R. HARNLY, P.E.



JUNE 30, 1975

the office of james p. collins, p.e.
474 THURSTON RD., ROCHESTER, N.Y. 14619 / 716-235-3772
CONSULTING GEOTECHNICAL ENGINEERS

jpc pe

LARKIN CREEK STORMWATER DETENTION FACILITY

TABLE OF CONTENTS

jpc pe

LARKIN CREEK STORMWATER DETENTION FACILITY
SOILS REPORT
FOR
WILLIAM C. LARSEN, P.E.

REFERENCE: AN RET P, 2330.00

INTRODUCTION

This soils report is for the proposed Larkin Creek Storm Water Detention Pond. The dam will be west of Elmgrove Road and south of St. Andrews Street in the town of Greece, Monroe County, New York. It will be owned and operated by the town of Greece. The creek has flooded homes along St. Andrews Drive and the new housing development north of St. Andrews Drive several times in the last few years. The dam will regulate the flow to rates that downstream culverts and channels can pass without damage.

The proposed 9-foot-high, 1,700-foot-long dam will hold approximately 100 acre feet of water. The water shed is approximately 1 square mile. The principal spillway will pass a 50-year frequency storm. Larger flows will pass through an emergency spillway in the east abutment.

SUMMARY OF SITE CONDITIONS

The dam site is low and heavily wooded. Drainage is to Larkin Creek and then north to Buck Pond on Lake Ontario. The land to the south and west of the site was farmed about five years ago. Housing developments north of the site were built within the

jpc pe

REFERENCE: AN RET P, 2330.00

SUMMARY OF SITE CONDITIONS (CON'T.)

last three to five years. The soils are well graded, medium dense, sandy silts and silty sands overlying bedrock at 8 to 12 feet. The water table is within 2 feet of the surface for about 1,300 feet along the center section of the dam.

SUMMARY OF RECOMMENDATIONS

We recommend a homogeneous, compacted earth fill embankment. Clearing and grubbing is necessary under the embankment. Acceptable borrow for the embankment is available on site. The natural moisture content of the on-site borrow is high and may require drying. We recommend opening a large borrow area for inplace drying. We recommend the embankment be placed in the summer or early fall when the water table is low and drying conditions best. Dewatering will be necessary along the embankment during construction.

SITE CONDITIONS

The site is on gently rolling land with a maximum relief of 26 feet. The borrow area is on a hill about 500 feet west of the dam.

The dam site is poorly drained and floods several times a year. The local drainage is into Larkin Creek and then north to Lake Ontario. The borrow area is on a low hill draining to Larkin Creek on one side and to the west to another local stream.

jpc
pe

REFERENCE: AN RET P, 2330.00

SITE CONDITIONS (CON'T.)

The site was farmed but is not in use now. We do not know of any on-site structures or utilities. The nearest buildings are the homes on St. Andrews Drive, 150 feet north of the dam.

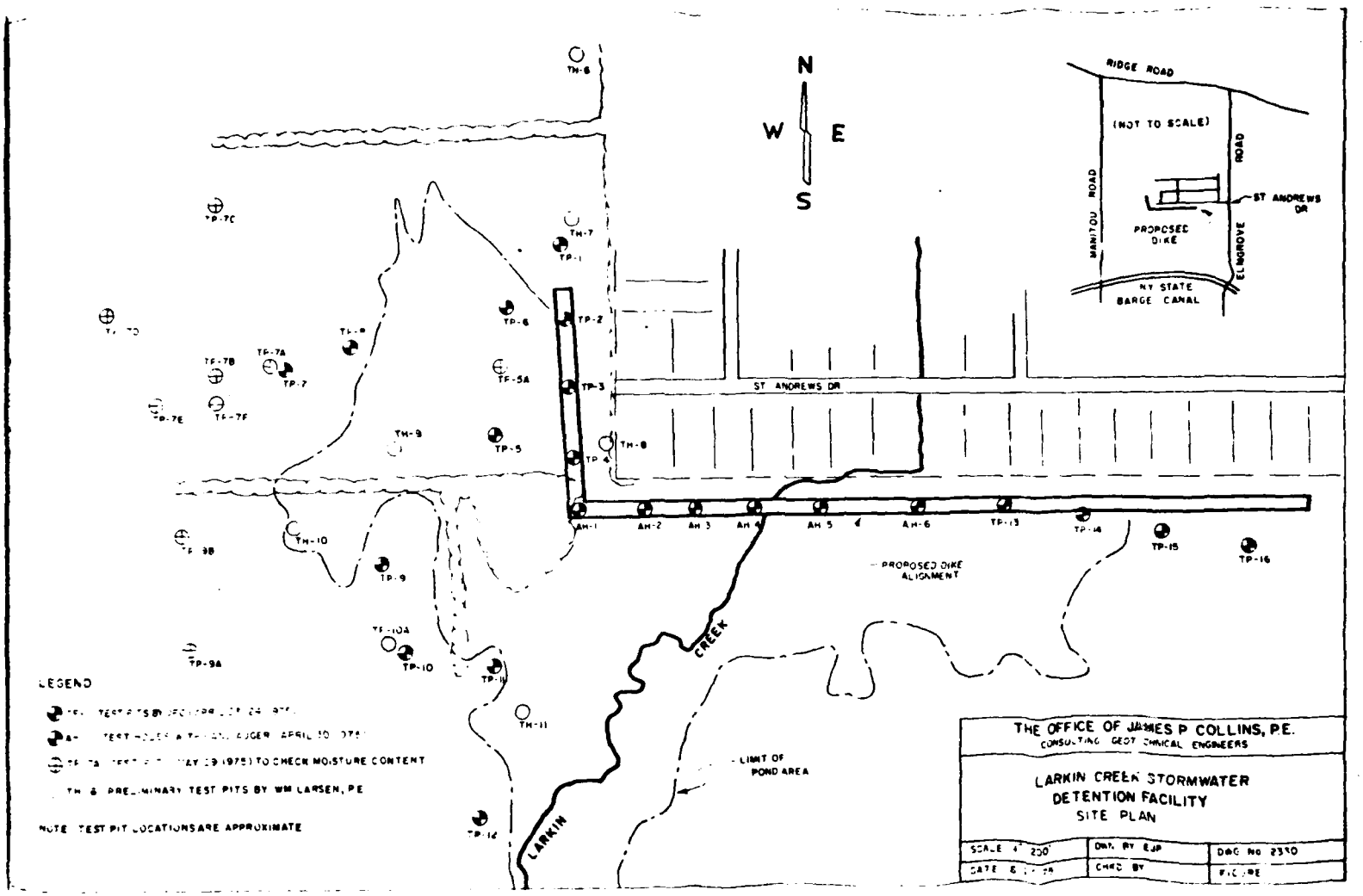
EXPLORATION AND TESTING

Eight test pits and six auger holes were dug along the centerline of the dam. The test pits were dug on April 22 and 23 with a Case 580 backhoe furnished by William Ehrmentraut. The test pits were at least 12 feet deep or to bedrock. Six hand auger holes were drilled in the densely wooded area. Eight additional test pits and ten hand auger holes were dug in proposed borrow areas. Samples were collected, and we logged the test pits. Test pit locations are shown on the site plan on the following page.

The testing program was set up to determine the type of soils in the dam subgrade and the soil types and conditions for embankment fill. The program includes soil classification, natural moisture content, and compaction curves for the soils in the proposed borrow areas. Test data is attached in the appendix.

GEOLOGIC HISTORY

The site is on the contact or transition between the Medina Sandstone and the underlying Queenston Shale. The Medina is a hard, fine-grained, red sandstone; the Queenston is a soft red shale. They are


N
W
E
S
RIDGE ROAD
(NOT TO SCALE)
MANITOU ROAD
ELMGROVE ROAD
ST ANDREWS DR
PROPOSED DIKE
NY STATE BARGE CANAL
ST ANDREWS DR
TH-6
TP-7C
TH-7
TP-1
TP-2
TP-6
TP-5A
TP-3
TH-8
TP-4
TH-9
TP-5
TP-7B
TP-7A
TP-7
TP-7E
TP-7F
TH-10
TP-9
TP-9A
TP-10A
TP-10
TP-11
TH-11
TP-12
AH-1
AH-2
AH-3
AH-4
AH-5
AH-6
TP-13
TP-14
TP-15
TP-16
PROPOSED DIKE ALIGNMENT
LIMIT OF POND AREA
LARKIN CREEK
LEGEND
TH & PRELIMINARY TEST PITS BY WM LARSEN, PE
NOTE TEST PIT LOCATIONS ARE APPROXIMATE
THE OFFICE OF JAMES P COLLINS, P.E.
CONSULTING GEOTECHNICAL ENGINEERS
LARKIN CREEK STORMWATER DETENTION FACILITY
SITE PLAN
SCALE 1" = 200'
DWN BY EJP
DWG No 2330
CHKD BY
FIGURE

jpc pe

REFERENCE: AN RET P, 2330.00

GEOLOGIC HISTORY (CON'T.)

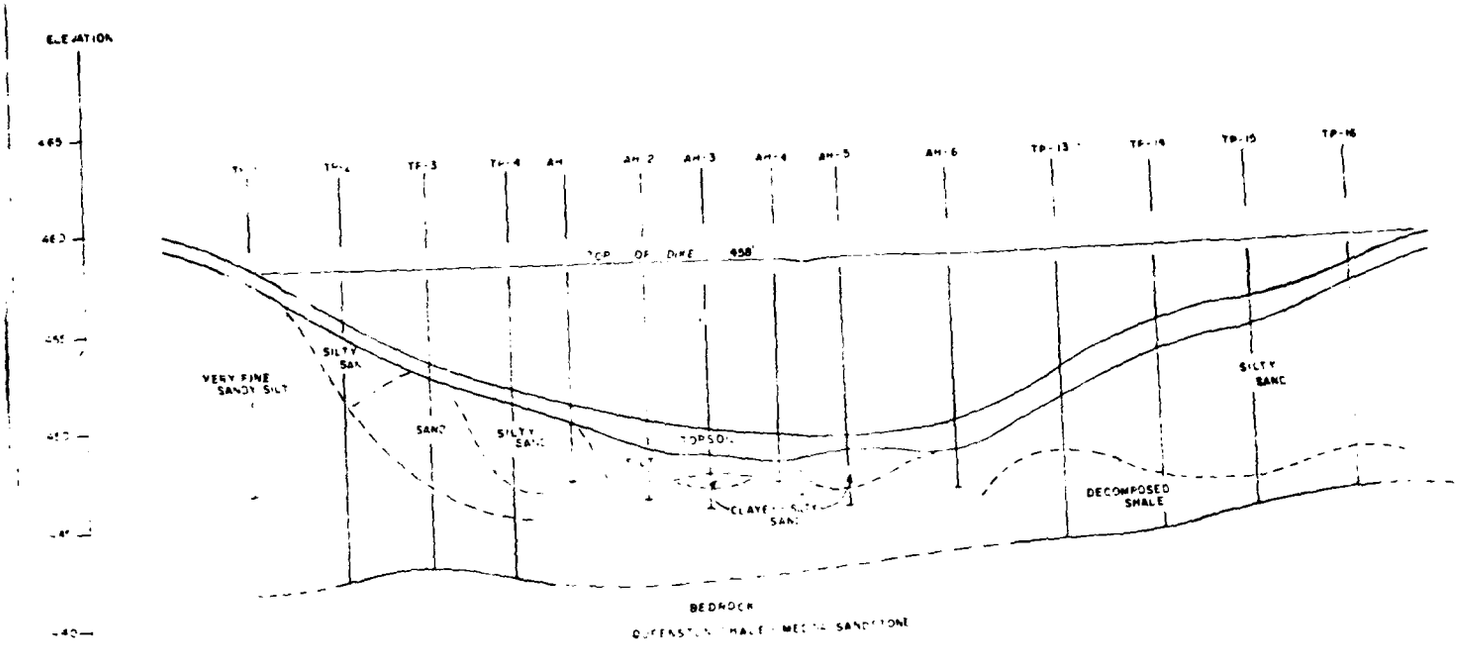
horizontally bedded with a slight southerly dip. Both formations are moderately jointed, vertically and horizontally, providing an open channel for lateral movement of water. Decomposed shale layers in the soil are probably blocks displaced from the Queenston by glacial action.

Glacial till, 8 to 12 feet thick, overlies bedrock. The till is an unsorted deposit of sandy silts and silty sands with large amounts of gravel, cobbles, and boulders. The proposed borrow area is on a small drumlin of glacial till with some clean sand and gravel layers. The silty and clayey sands in the low area are stream deposits, filling former channels and covering the surrounding flood plain.

SOIL, ROCK, AND GROUNDWATER CONDITIONS

The soils are generally silty sand and sandy silts with pockets of clay and clean sand. The soils are loose to medium dense. Bedrock is at about elevation 540 feet, 8 to 12 feet below the surface. The bedrock is horizontally bedded and fractured near the surface. The backhoe excavated 1 to 2 feet into the bedrock at test pits 3, 4, 14, 15, and 16. The dam centerline soil profile is on the following page.

The water table is at about elevation 549 feet through the center of the dam site and slightly higher on both



LEGEND

TP-1 TEST PITS BY J.P.C. (APRIL 23-24, 1975)

AH-1 TEST HOLES BY HARD AUGER (APRIL 30, 1975)

NOTE THIS PROFILE WAS DEVELOPED BY INTERPOLATION BETWEEN WIDELY SPACED TEST HOLES. IT IS OUR INTERPRETATION OF SOIL AND ROCK CONDITIONS, HOWEVER, SOIL CONDITIONS MAY VARY BETWEEN TEST HOLES.

TEST HOLE LOCATIONS ARE APPROXIMATE SEE SITE PLAN FOR LOCATIONS

SCALE
HOR: 1" = 200'
VERT 1" = 5'

THE OFFICE OF JAMES P. COLLINS, PE
CONSULTING GEOTECHNICAL ENGINEERS

LARKIN CREEK STORMWATER DETENTION FACILITY

DAM CENTERLINE - SOIL PROFILE

SCALE AS SHOWN	DWN BY EJF	JOB NO 2330
DATE 6/30/75	CHKD BY	FIGURE 2

jpc
pe

REFERENCE: AN RET F, 2330.00

SOIL, ROCK, AND GROUNDWATER CONDITIONS (CON'T.)

ends. The groundwater in May varied from 1 foot below the surface near Larkin Creek to 9 feet below the surface on the west abutment. The groundwater was probably at a seasonal high after the spring rains and snow melted and will probably be 1 to 2 feet lower during the summer and early fall.

RECOMMENDATIONS

We recommend a homogeneous compacted earth fill dam. The slope should be 3 horizontal to 1 vertical (3 on 1) on both the upstream and downstream faces. The factor of safety against this embankment sliding is over 3.0. The available on-site borrow would safely stand on a 2 on 1 slope. However, this would require additional erosion control. Also, these flatter slopes increase the dam cross section in a wooded area where rodents may be a problem. We saw signs of muskrat, a burrowing animal, along the creek. We recommend frequent inspections of the dam and control of these and other rodents.

Seepage through the dam was checked for both volume and piping. The factor of safety against piping is approximately 4.0. Seepage through the clean sand found at test pits 3 and 4 will be a problem. We recommend removal and replacement of any sand with less than 20 percent passing a No. 200 sieve with compacted embankment fill. This core should be a minimum of 10 feet wide and through the entire depth of sand. A

jpc
pe

REFERENCE: AN RET P, 2330.00

RECOMMENDATIONS (CON'T.)

drainage swale along the downstream toe should divert any seepage back to the creek.

The area under the dam will have to be cleared of all trees, stumps, roots, brush, and rubbish. Disposal areas should be designated on the plans or the specifications should require off-site disposal. The dam foundation should be inspected by a soils engineer, after clearing and grubbing, then leveled and proof-rolled with at least three passes of approved compaction equipment. Irregularities and old stream channels should be cleaned as directed by the soils engineer.

The embankment fill may be any of the silty sands or sandy silts found near the site. The fill must be well graded and free of debris, organic soil, and rocks over 6 inches in diameter. At least 30 percent shall pass a No. 200 sieve. The fill should be compacted to at least 90 percent of dry density by ASTM D-1557. Compaction equipment should be approved by the engineer. Earth moving equipment, such as pans, scrappers, and tracked vehicles, should not be approved as compaction equipment. One density test (ASTM D-1556, sand cone method) should be made for each 200 cubic yards of fill or as directed by the engineer. A soils technician should be on the site whenever the contractor is placing fill. The technician should be prepared to run the density tests as required and moisture density curves ASTM D-1557 whenever the fill material changes.

jpc
pe

REFERENCE: AN RET P, 2330.00

RECOMMENDATIONS (CON'T.)

The moisture content of the inplace soils was high when we tested the site in April. Tests taken in June, 1975, were within a compactible range. We recommend that a relatively large area be designated for borrow material and that the cut be less than 5 feet deep. A large area will allow inplace mixing and drying. The borrow area should be graded to drain at all times.

The site will have to be dewatered during construction of the embankment. We suggest that gravel-filled sump pits be excavated into bedrock. This operation should be started as early as possible since the silts will be slow draining. If the site is not dewatered, we expect serious problems in placing the first few lifts of compacted fill over the natural soil.

We recommend that the old stream channel be filled and that the channel be ripraped where the new channel leaves the old channel. Any on-site clean fill will be satisfactory. Compact the fill with two passes of a tracked vehicle.

The principal spillway through the dam will require special attention. The work area should be dewatered. The pipe and structures should be placed on the natural soil and backfill carefully compacted. We recommend using the most clayey soil available on the site for backfill. Special care should be taken to insure that no voids are left along the pipe or around the structure and cutoffs.

jpc
pe

REFERENCE: AN RET P, 2330.00

CONSTRUCTION PROBLEMS

These soils will be difficult to dewater. The first lifts over the natural soil will be difficult to place and compact. We suggest that the contractor use soils several percent dry of optimum in the first few lifts. We also suggest that he build the base at least 2 feet above the surrounding ground as he progresses along the dam. This will reduce the possibility of pumping moisture up from the subsoil and will reduce the probability of saturating the fill during a flash flood.

We recommend that the dam be built during the summer or early fall. The water table will be high during the winter and spring, making the site more difficult to dewater. Also, drying conditions are poor in the Rochester area except in the summer and early fall.

jpc
pe

REFERENCE: AN RET P, 2330.00

Appendix 1. Laboratory Test Data
Gradation Curves

JPC pe

LARKIN CREEK STORMWATER DETENTION FACILITY

LABORATORY DATA SUMMARY

Boring or Test Pit No.	Depth (Feet)	Soil Classification (Unified System)	Natural Moisture (%)	Atterberg Limits			Specific Gravity	Compaction Test—ASTM-D-15	
				L.L.	P.L.	P.I.		Max. Dry Density (PCF)	Optimum Moisture (%
TP-1	4.0	ML*	16.1						
TP-2	3.5	SM*	17.7						
TP-2	7.0	ML*	13.5						
TP-3	2.0	SP**	18.7						
TP-3	4.0	SP**	21.0						
TP-3	7.0	ML*	10.1						
TP-5	3.0	ML*	13.4						
TP-5A	2.0	ML*	12.3				2.66	129.2	9.4
TP-5A	5.5	SM-ML**					2.65		
TP-6	3.0	ML*	16.9						
TP-7	4.0	ML-SM**							
TP-7	2.5	ML-SM*	15.3				2.65	132.1	8.1
TP-7A	2.3	ML-SM*	10.3						
TP-7B	2.2	ML-SM*	13.6						
TP-7C	2.0	ML-SM*	9.5						
TP-7D	2.0	ML-SM*	14.6						
TP-7E	2.0	ML-SM*							
TP-7F	2.0	ML-SM*	6.2						
TP-7G	2.0	ML-SM*							
TP-9A	2.0	ML*	8.1						
TP-9B	2.0	ML*	15.2						
TP-9B	1.9	ML*	16.4						
TP-9C	2.0	ML*							
TP-10	4.0	ML*	15.6				2.67	129.2	8.5
TP-10A	2.5	ML**					2.65	128.3	10.5
TP-10B	2.0	ML*	14.7						
TP-11	2.5	SM**					2.65	126.8	10.0
TP-13	2.5	SM*	14.4						
TP-13	5.0	ML*	17.5						
TP-13	6.0	ML*	17.0						
TP-14	4.0	SM*	17.9						

LARKIN CREEK STORMWATER DETENTION FACILITY

LABORATORY DATA SUMMARY

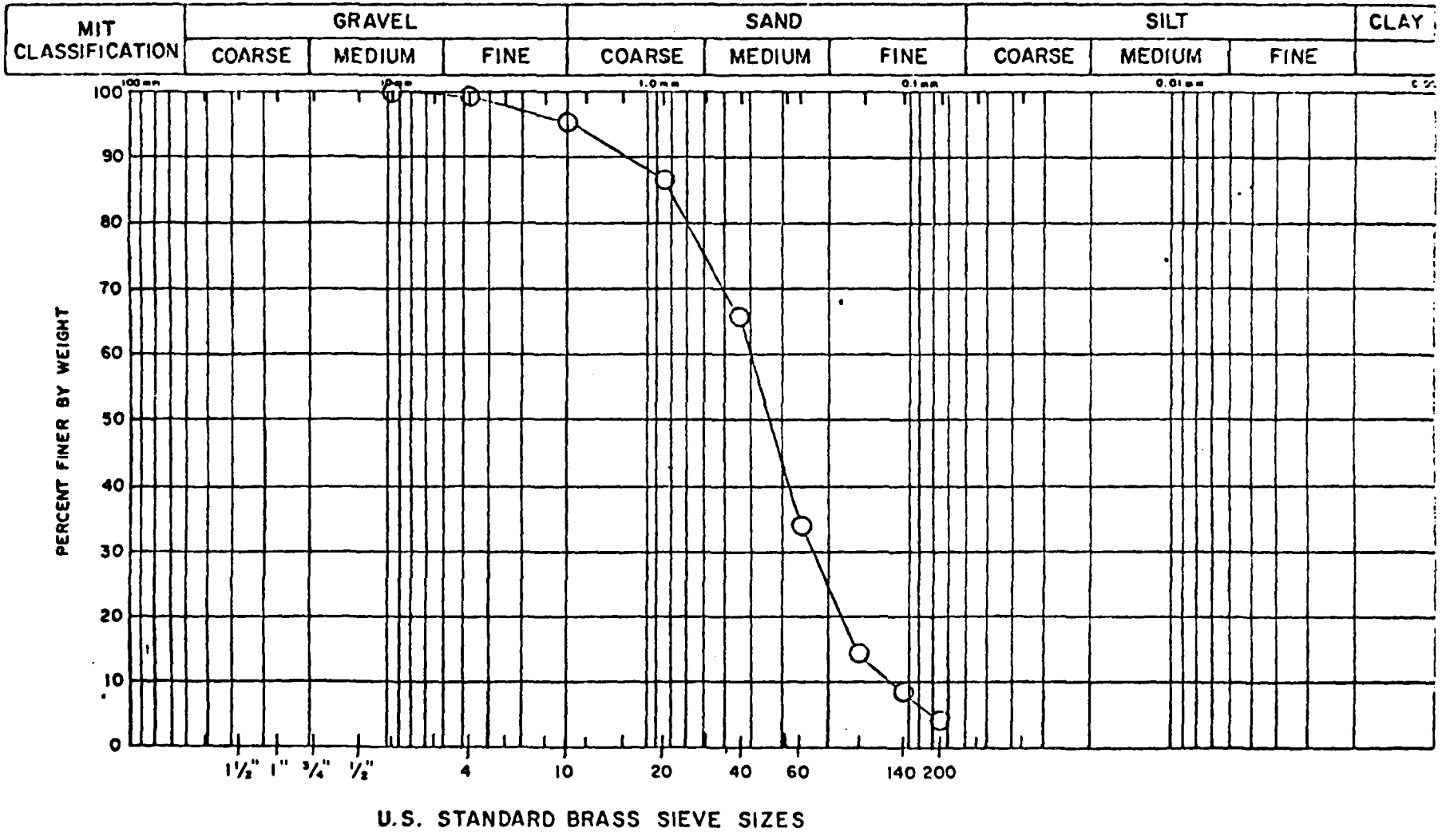
Boring or Test Pit No.	Depth (Feet)	Soil Classification (Unified System)	Natural Moisture (%)	Atterberg Limits			Specific Gravity	Compaction Test—ASTM-D-15	
				L.L.	P.L.	P.I.		Max. Dry Density (PCF)	Optimum Moisture (%
AH-1	2.0	SM*	21.0						
AH-1	3.0	SM*	17.4						
AH-1	4.0	SM*	16.3						
AH-1	2.5	SM**					2.65		
AH-2	2.0	ML*	23.8						
AH-3	1.7	ML*	29.4						
AH-3	2.0	ML*	30.0						
AH-3	2.8	SM-SC*	19.7	24.7	19.6	5.1			
AH-4	2.0	SM**	26.3				2.65		
AH-4	2.5	SM*	21.4						
AH-5	1.0	SM-SC*	33.9	27.3	19.1	8.2			
AH-5	2.3	SM*	25.9						
AH-5	3.0	SM*	22.0						
AH-5	3.5	SM*	21.4						
AH-6	2.0—2.5	SM*	16.0						
AH-6	3.0—3.5	SM*	17.6						

*Visual Classification
**See Appendix 1 for Grain Size Distribution

PROJECT AN RET P

BORING No. TP-3 SAMPLE No. S-1 TEST BY EJP REMARKS SP Fine to coarse SAND. SHEET No. 1 OF 8

SAMPLE DEPTH 2.0 ft. DATE 5/14/75



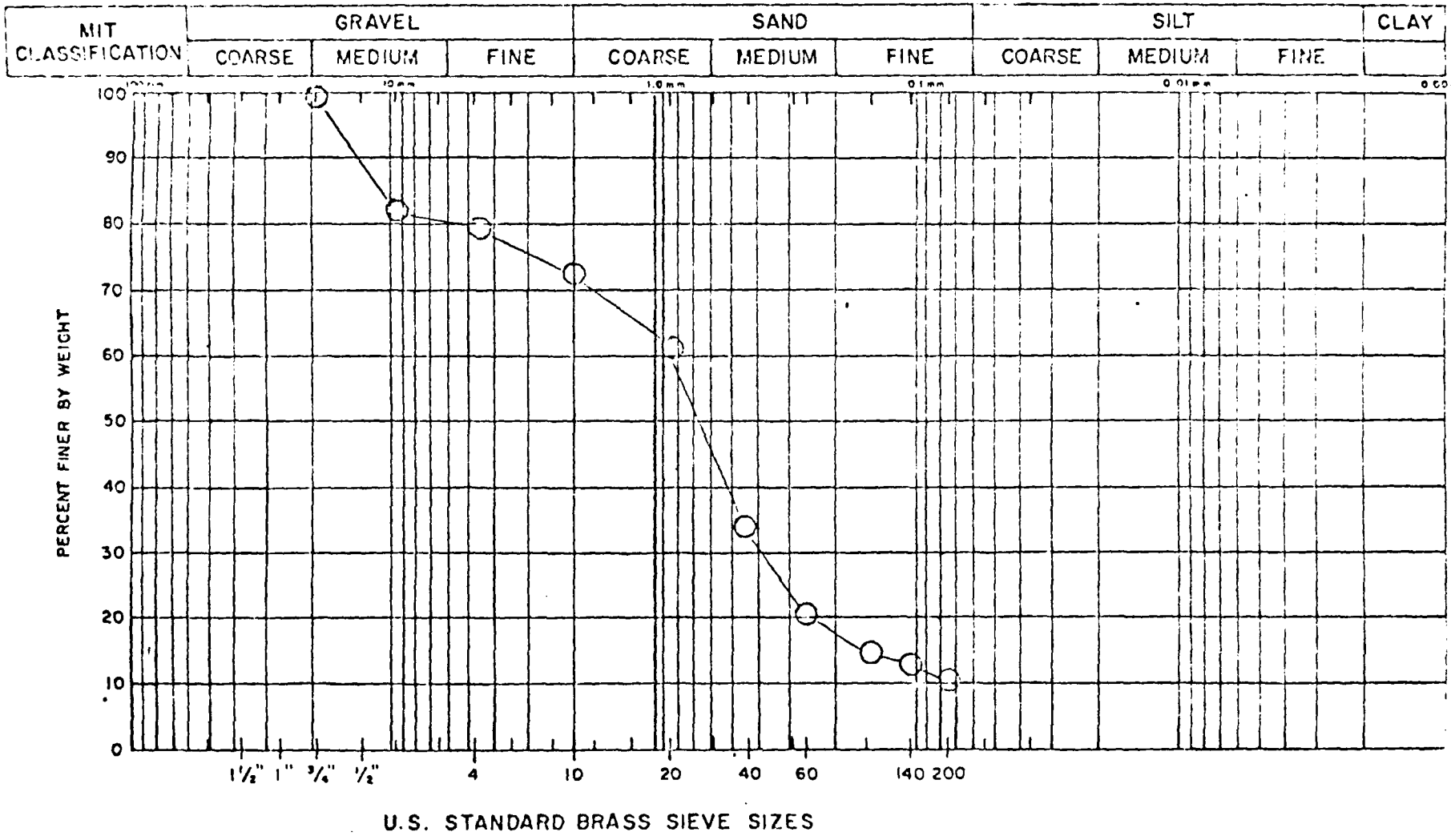
Form No. 14-70

JAMES R COLLINS & ASSOCIATES
CONSULTING SOILS AND FOUNDATION ENGINEERS

PROJECT

BORING NO. [illegible] SAMPLE NO. S-2 TEST BY EJP REMARKS SP Fine to coarse SAND, SHEET NO. 2 OF 8

SAMPLE DEPTH 4.0 ft. DATE 5/14/75 some gravel, trace silt



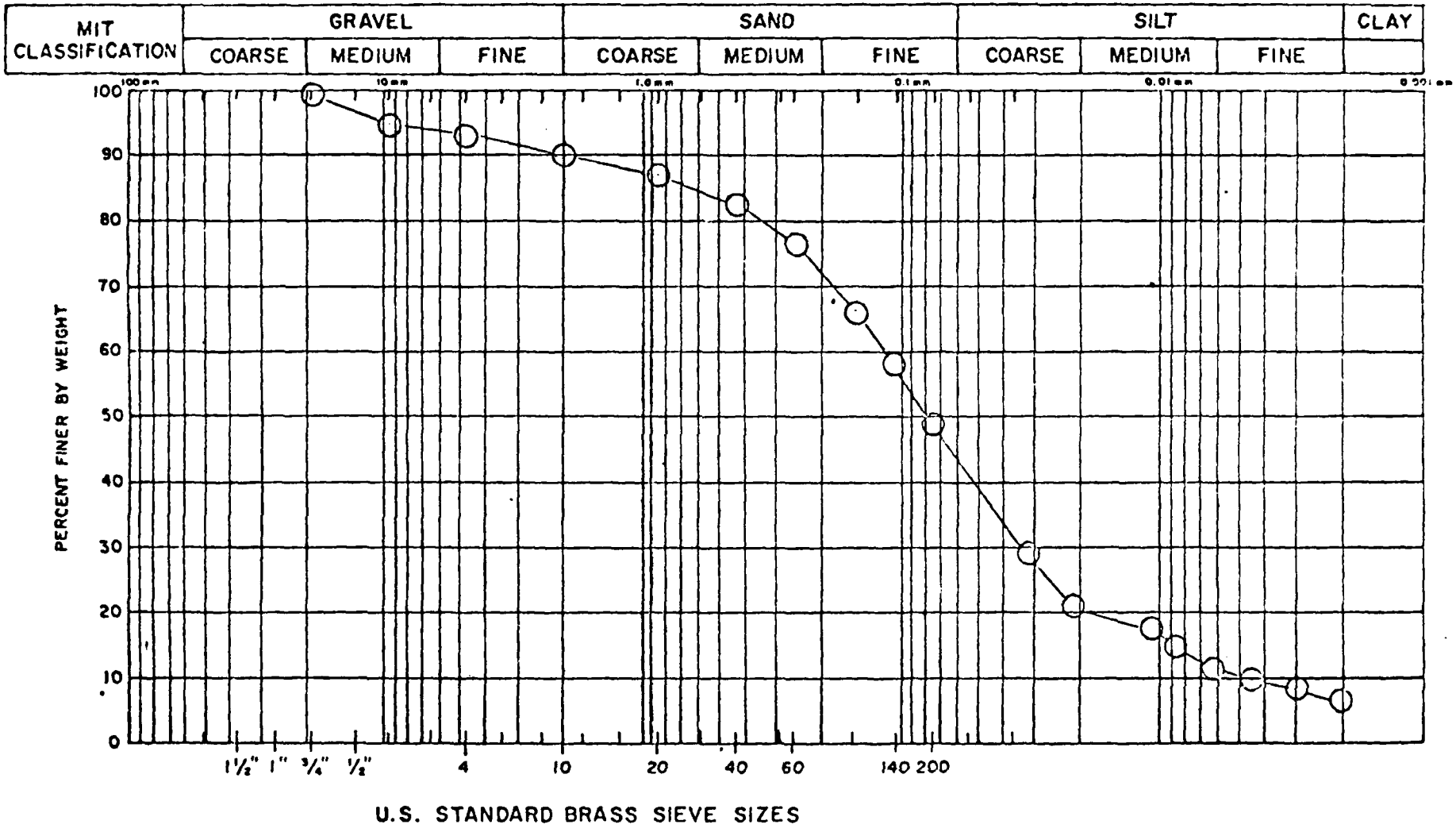
Form No. 14-70

JAMES R COLLINS & ASSOCIATES
CONSULTING SOILS AND FOUNDATION ENGINEERS

PROJECT

BORING No. A11-1 SAMPLE No. _____ TEST BY EJP REMARKS SM Fine to coarse SAND, SHEET No 3 OF 8
some silt, trace
gravel.

SAMPLE DEPTH 2.5 ft. DATE 5/14/75

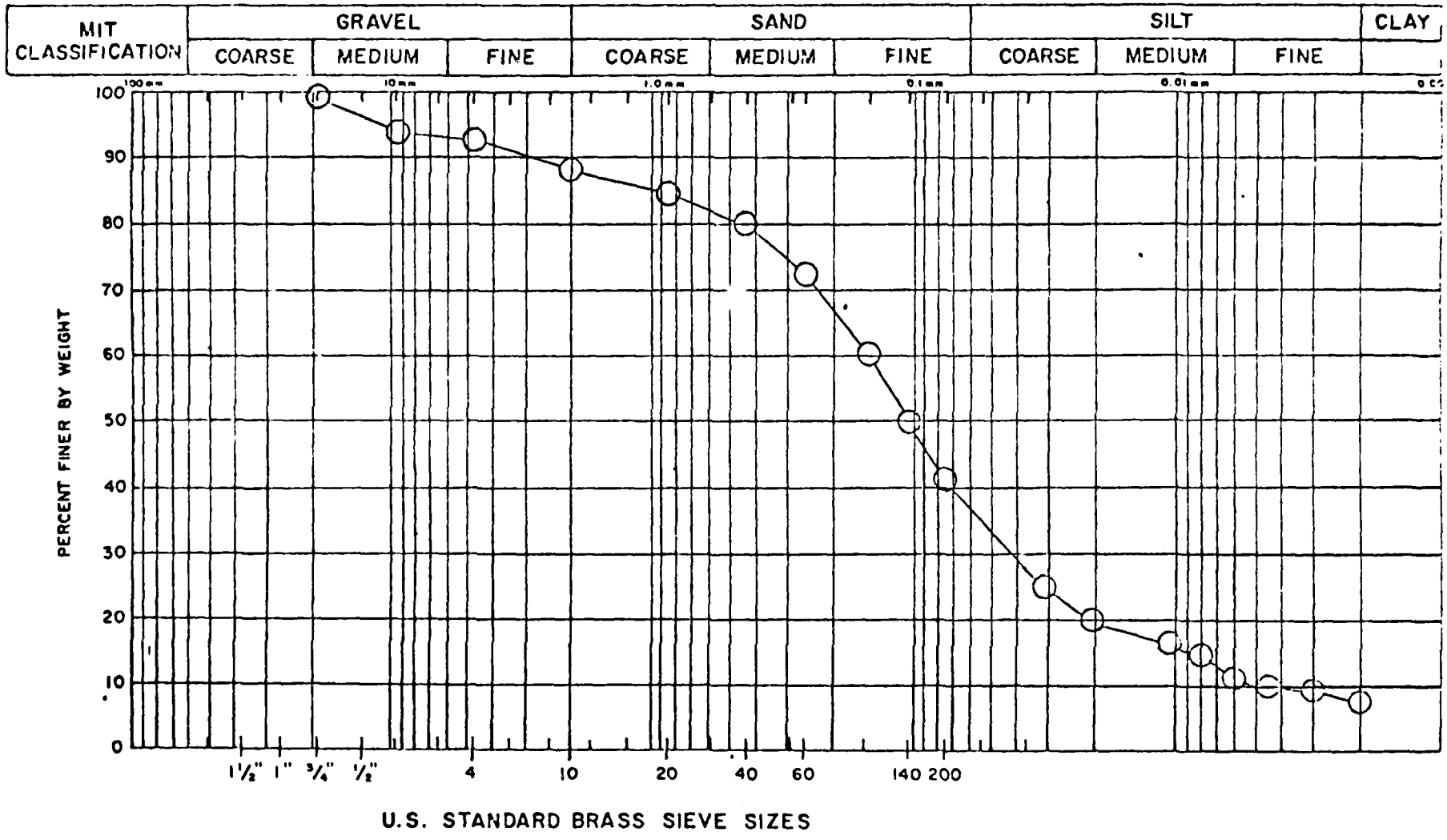


Form No. 14-70

JAMES R COLLINS & ASSOCIATES
CONSULTING SOILS AND FOUNDATION ENGINEERS

BORING No. MW-6 SAMPLE No. _____ TEST BY EJP REMARKS SM SAND, little silt, trace gravel. SHEET No. 4 OF 8

SAMPLE DEPTH 2.0 ft. DATE 5/14/75

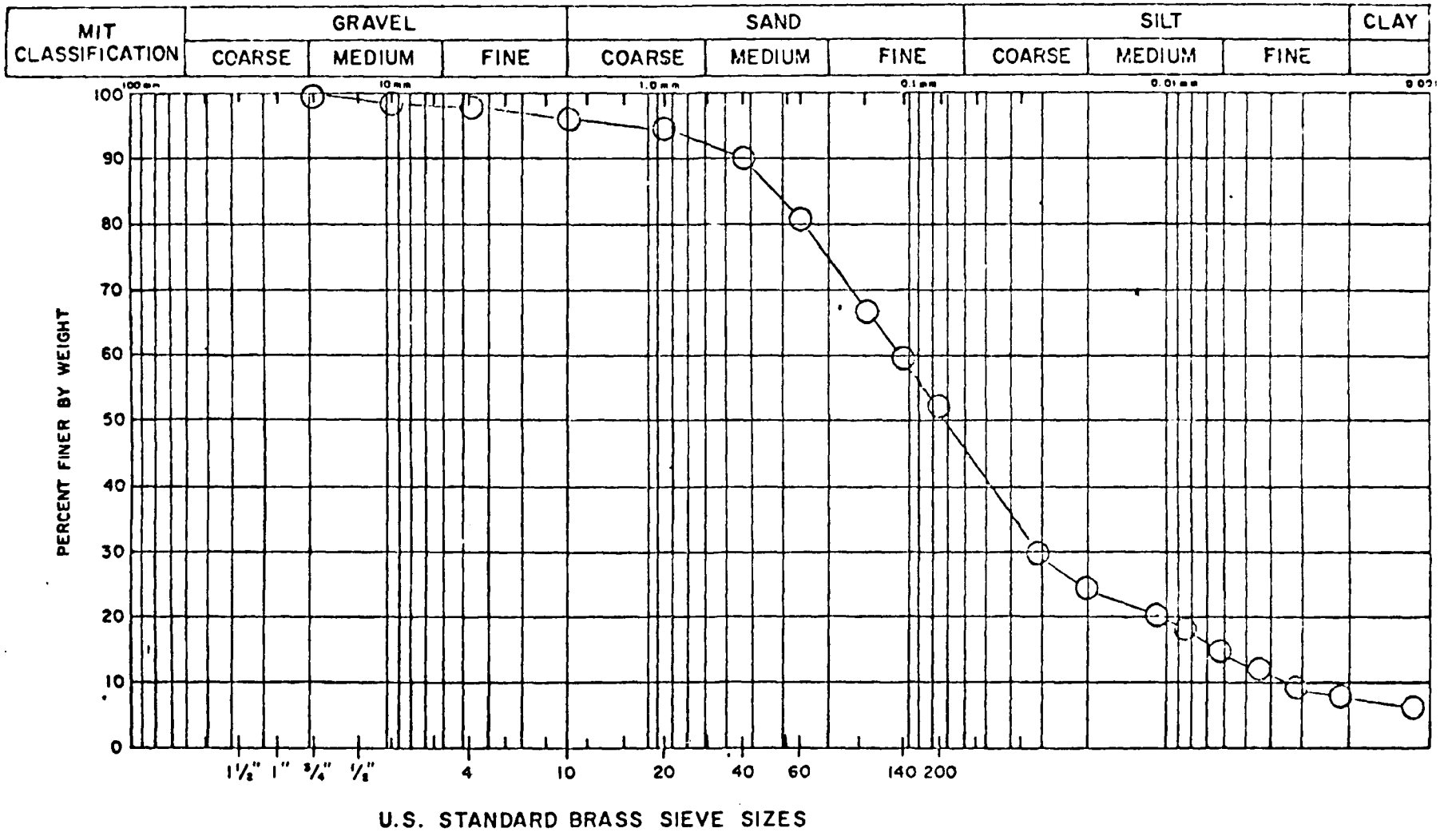


Form No. 14-70

JAMES R COLLINS & ASSOCIATES
CONSULTING SOILS AND FOUNDATION ENGINEERS

PROJECT No. 75-94 SAMPLE No. ____ TEST BY EJP REMARKS SM-ML Fine to medium SAND and SILT SHEET No. 5 OF 8

SAMPLE DEPTH 5.5 ft. DATE 5/14/75



Form No. 14-70

JAMES R COLLINS & ASSOCIATES
CONSULTING SOILS AND FOUNDATION ENGINEERS

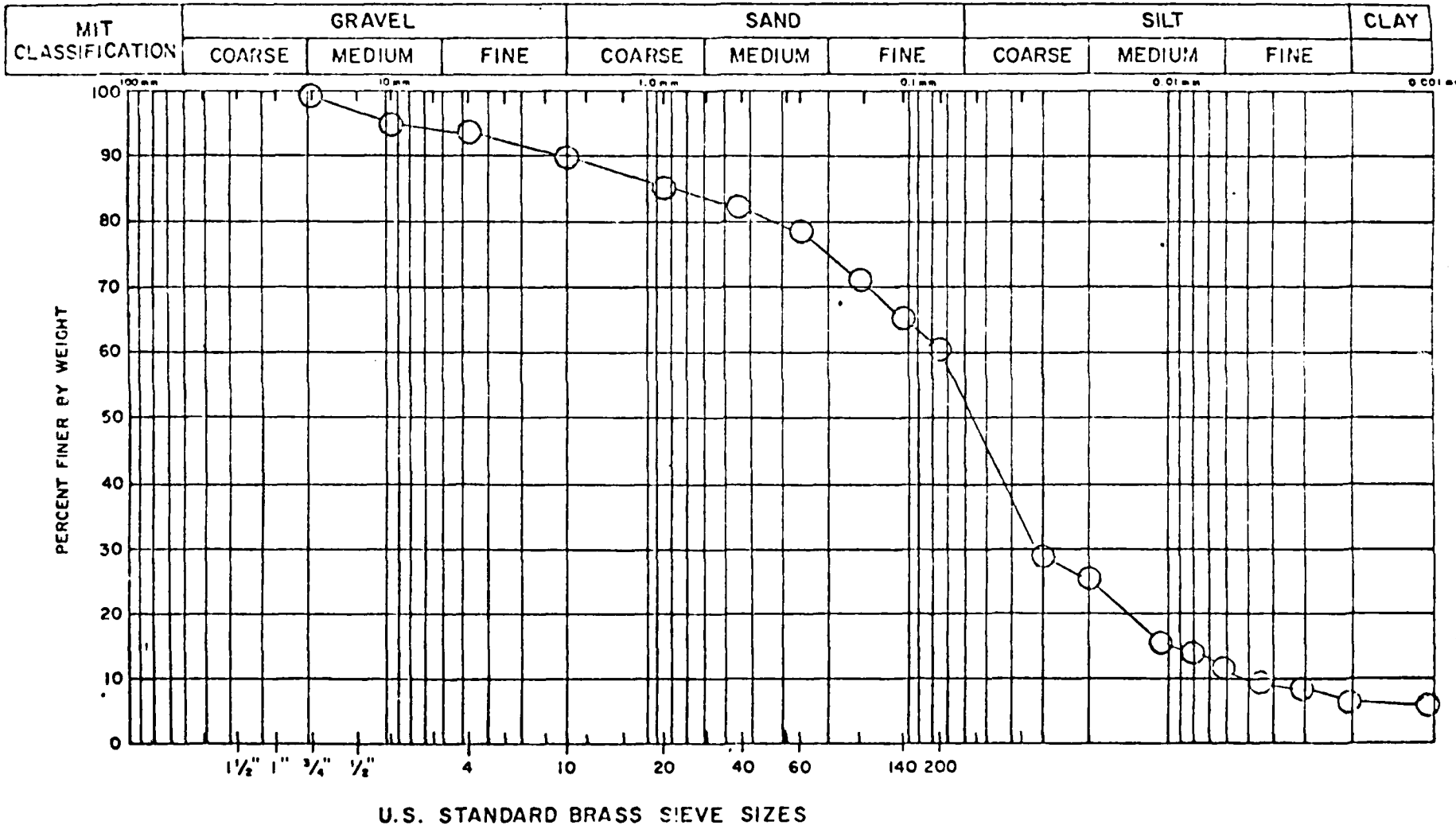
PROJECT [illegible]

BORING No. TP-7 SAMPLE No. _____ TEST BY EJP

SAMPLE DEPTH 2.5—3.0 ft. DATE 5/14/75

REMARKS ML-SM SILT and fine to coarse SAND, trace gravel

SHEET No. 8 OF 8



Form No. 14-70

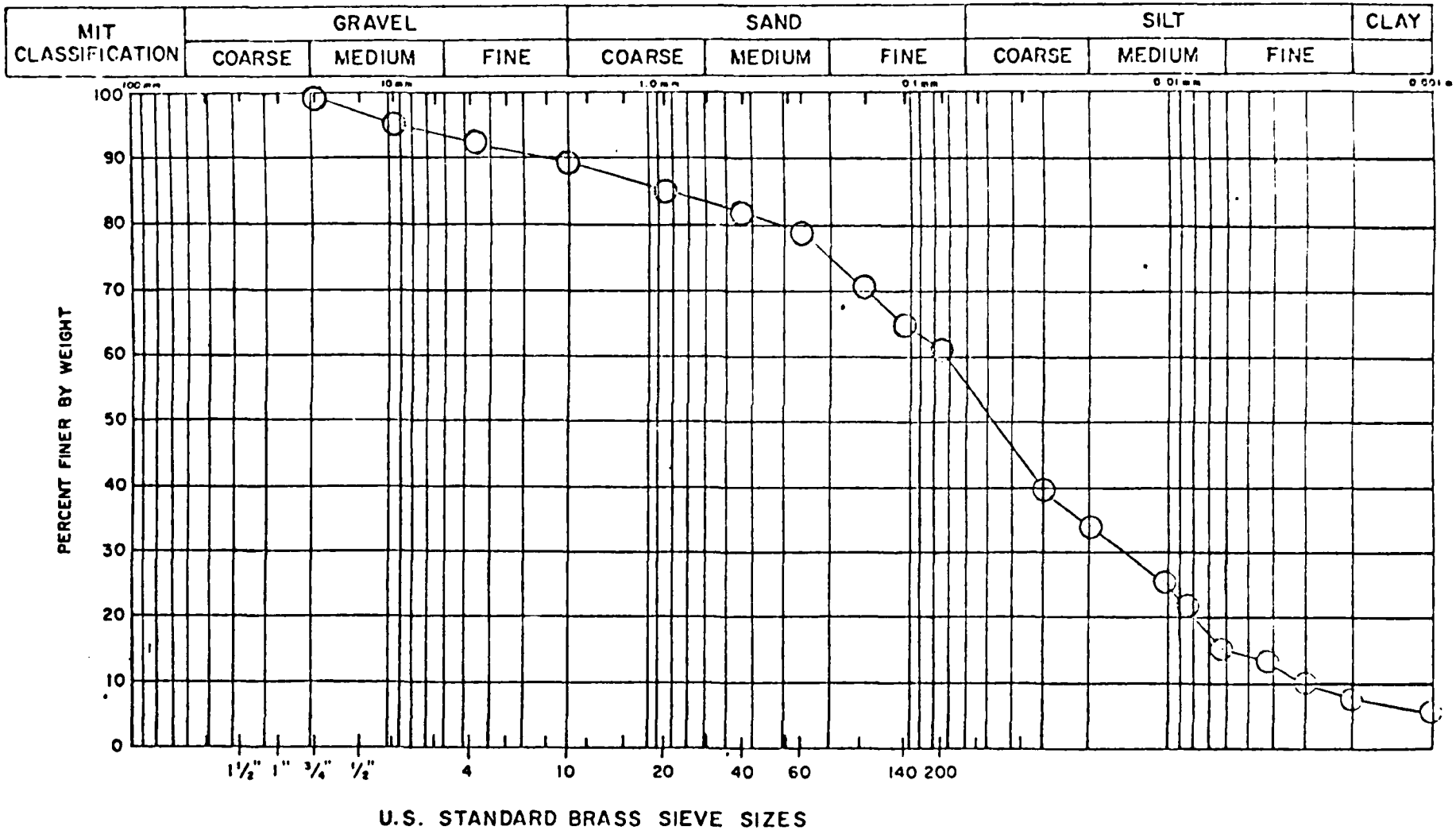
JAMES R COLLINS & ASSOCIATES

CONSULTING SOILS AND FOUNDATION ENGINEERS

PROJECT [illegible]

BORING No. TP-10 SAMPLE No. ____ TEST BY EJP REMARKS ML SILT, some fine to coarse sand, trace gravel SHEET No. 7 OF 8

SAMPLE DEPTH 2.5—3.0 ft. DATE 5/14/75



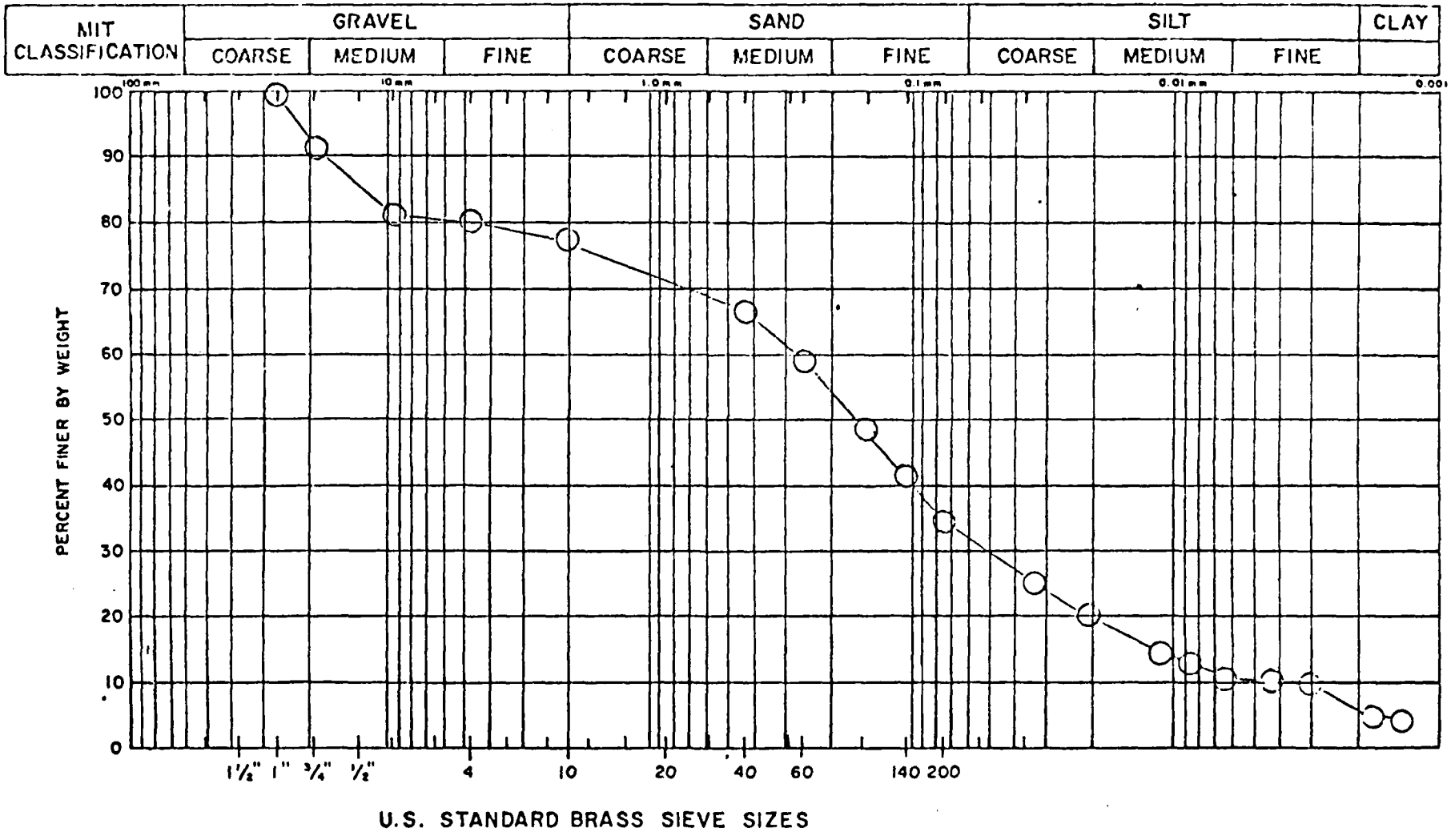
Form, No. 14—70

JAMES R COLLINS & ASSOCIATES
CONSULTING SOILS AND FOUNDATION ENGINEERS

PROJECT [illegible]

BORING No TP-11 SAMPLE No. _____ TEST BY EJP REMARKS SM Silty fine to coarse SHEET No. 8 OF 8

SAMPLE DEPTH 2.5 ft. DATE 5/14/75 SAND, little gravel



Form No. 14-70

JAMES R COLLINS & ASSOCIATES
CONSULTING SOILS AND FOUNDATION ENGINEERS

jpc
pe

REFERENCE: AN RET P. 2330.00

Appendix 2. Test Pit Logs TP-1 through TP-16, AH-1 through AH-6 by The Office of James P. Collins, P.E.

Boring Log Legend

Test Hole Logs No. 1 through No. 19 by William C. Larsen, P.E.

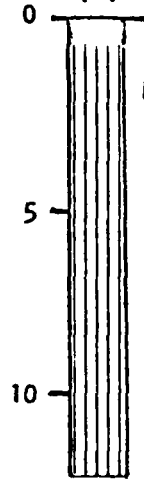
LOG OF TEST PIT

No. TP-1

jpc pe

LARKIN CREEK STORMWATER
DETENTION FACILITY
TOWN OF GREECE, NEW YORK

DEPTH(ft) **ELEVATION** 457.9 **DATE** 4/22/75



TOPSOIL 0.7 ft.

AL Medium dense, red-brown SILT, little medium to fine sand, some coarse gravel, cobbles and boulders.

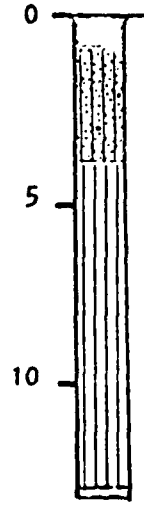
No bedrock encountered.

Bottom of hole 12.0 ft.

LOG OF TEST PIT

No. TP-2

DEPTH(ft) **ELEVATION** 454.2 **DATE** 4/22/75



TOPSOIL 0.7 ft.

SM Loose to medium dense, brown, silty fine SAND, trace gravel, cobbles and boulders.

ML Medium dense, red SILT, some fine sand, trace gravel, cobbles and boulders.

TOP OF ROCK 13.0 ft.

QUEENSTON SHALE—slightly weathered, moderately fractured.

Bottom of hole 13.0 ft.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

AN RE: P, 2330.00

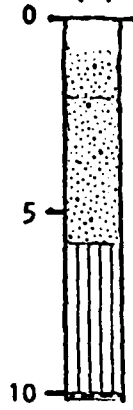
LOG OF TEST PIT

NO. TP-3

JDC PC

LARKIN CREEK STORMWATER
DETENTION FACILITY
TOWN OF GREECE, NEW YORK

DEPTH(ft) ELEVATION 453.1 DATE 4/22/75



TOPSOIL 0.7 ft.

SP Loose, red-yellow, fine to coarse SAND.

SP Red-brown, fine to coarse SAND, some gravel, trace silt, cobbles and boulders.

ML Red-gray SILT, trace fine sand, trace gravel.

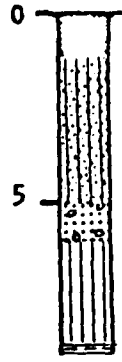
TOP OF ROCK 10.0 ft.

Bottom of hole 10.0 ft.

LOG OF TEST PIT

No. TP-4

DEPTH(ft) ELEVATION 451.0 DATE 4/22/75



TOPSOIL 1.0 ft.

SM Medium dense to dense, red-gray, silty, very fine SAND, cobbles.

SP-GP Red, fine to coarse SAND and GRAVEL, trace silt.

ML Dense, gray SILT, some sand and gravel lenses.

TOP OF ROCK 9.0 ft.

Bottom of hole 9.0 ft.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

AN RET P, 2330.00

LOG OF TEST PIT

No. TP-5

jpc pe

LARKIN CREEK STORMWATER
DETENTION FACILITY
TOWN OF GREECE, NEW YORK

DEPTH(ft)		ELEVATION	DATE 4/22/75
0		TOPSOIL 0.6 ft.	
	ML	Dense, red-brown SILT, trace fine sand, trace clay, moist, slightly plastic, cobbles.	
5	SM-ML	Loose to medium dense, red, fine to coarse SAND and SILT, some coarse sand layers.	
		TOP OF ROCK 9.0 ft.	
		Bottom of hole 9.0 ft.	

LOG OF TEST PIT

No. TP-6

DEPTH(ft)		ELEVATION	DATE 4/22/75
0		TOPSOIL 0.3 ft.	
	ML	Medium dense, red, very fine sandy SILT, moist, nonplastic.	
	ML	12-inch layer, medium dense SILT, trace clay, moist, slightly plastic.	
5	ML	Medium dense, very fine sandy SILT, some coarse sand layers.	
		TOP OF ROCK 8.5 ft.	
		Bottom of hole 8.5 ft.	

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

AN RET P, 2330.00

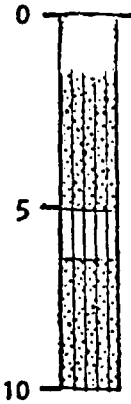
LOG OF TEST PIT

No. TP-7

jpc pe

LARKIN CREEK STORMWATER
DETENTION FACILITY
TOWN OF GREECE, NEW YORK

DEPTH(ft) | **ELEVATION** | **DATE** 4/22/75



TOPSOIL 1.5 ft.

ML-SM Loose to medium dense, red SILT and fine to coarse SAND, trace gravel, wet, non-plastic, cobbles.

ML Dense, green, SILT, trace coarse sand, damp, nonplastic.

SM Loose, red, silty fine SAND, wet, non-plastic.

No bedrock encountered.

Bottom of hole 10.0 ft.

LOG OF TEST PIT

No. TP-8

DEPTH(ft) | **ELEVATION** | **DATE** 4/22/75

TOPSOIL 1.0 ft.

SM Yellow-brown, silty fine SAND, some gravel, cobbles, wet.

SM-GM Red, silty fine to coarse SAND and GRAVEL.

Bottom of hole 4.0 ft.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

AN RET P, 2330.00

LOG OF TEST PIT

No. TP-9

jpc pc

LARKIN CREEK STORMWATER
DETENTION FACILITY
TOWN OF GREECE, NEW YORK

DEPTH(ft)		ELEVATION	DATE 4/22/75
0		TOPSOIL 0.7 ft.	
	ML	Yellow-brown SILT, trace very fine sand, trace clay, wet, slightly plastic.	
5	ML	Red SILT and DECOMPOSED SHALE layers.	
		TOP OF ROCK 6.0 ft.	
		Bottom of hole 6.0 ft.	

LOG OF TEST PIT

No. TP-10

DEPTH(ft)		ELEVATION	DATE 4/22/75
0		TOPSOIL 1.0 ft.	
	ML	Medium dense, red-brown, fine sandy SILT, trace fine gravel, some cobbles, wet, nonplastic.	
5			
	ML	Medium dense to dense, red SILT, trace fine gravel, damp, nonplastic.	
10		Bottom of hole 10.0 ft.	

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

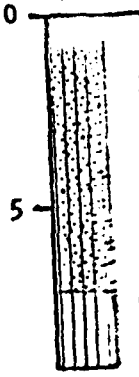
LOG OF TEST PIT

No. TP-11

jpc

LARKIN CREEK STORMWATER
DETENTION FACILITY
TOWN OF GREECE, NEW YORK

DEPTH(ft) ELEVATION DATE 4/22/75



SM — Medium dense, red, silty fine to coarse SAND, little gravel, wet, cobbles and shale fragments.

ML — Medium dense to dense, red SILT, trace fine gravel, damp, nonplastic.

Bottom of hole 9.0 ft.

LOG OF TEST PIT

No. TP-12

DEPTH(ft) ELEVATION DATE 4/22/75

TOPSOIL 0.7 ft.

ML — Medium dense, red, fine sandy SILT, moist, nonplastic, cobbles and boulders.

TOP OF ROCK 8.5 ft.

Bottom of hole 8.5 ft.

The stratification lines represent the approximate boundaries between soil types. The actual transition may be gradual.

AN RET P, 2330.00

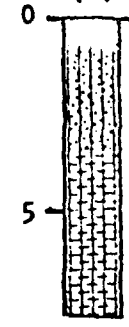
LOG OF TEST PIT

No. TP-13

jpc pc

LARKIN CREEK STORMWATER
DETENTION FACILITY
TOWN OF GREECE, NEW YORK

DEPTH(ft) **ELEVATION** 451.6 **DATE** 4/23/75



TOPSOIL 0.6 ft.

SM Loose to medium dense, red, silty fine SAND, little gravel and shale fragments, wet, nonplastic.

ML Dense, red, fine sandy SILT and DECOMPOSED SHALE layers and boulders.

TOP OF ROCK 8.0 ft.

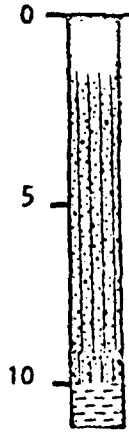
QUEENSTON SHALE—MEDINA SANDSTONE, slightly weathered, moderately fractured.

Bottom of hole 8.0 ft.

LOG OF TEST PIT

No. TP-14

DEPTH(ft) **ELEVATION** 454.7 **DATE** 4/23/75



TOPSOIL 1.5 ft.

SM Loose to medium dense, red, silty SAND, some coarse gravel, cobbles and boulders.

Silty SAND and DECOMPOSED SHALE.

TOP OF ROCK—10.0 ft.

Bottom of hole 11.0 ft.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

AN RET P, 2330.00

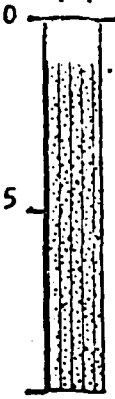
LOG OF TEST PIT

No. TP-15

jpc pc

LARKIN CREEK STORMWATER
DETENTION FACILITY
TOWN OF GREECE, NEW YORK

DEPTH(ft) **ELEVATION** 454.7 **DATE** 4/23/75



TOPSOIL 1.0 ft.

SM Medium dense, red, silty medium to fine SAND, some gravel, cobbles and boulders

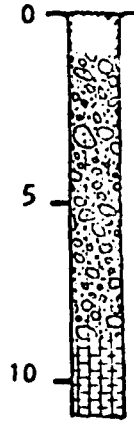
4-inch sand layer.

TOP OF ROCK 10.0 ft.

LOG OF TEST PIT

No. TP-16

DEPTH(ft) **ELEVATION** 456.4 **DATE** 4/23/75



TOPSOIL 1.0 ft.

SM-GM Medium dense, red, silty fine SAND and GRAVEL, cobbles.

TOP OF ROCK 9.0 ft.

DECOMPOSED SHALE.

Bottom of hole 11.0 ft.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

AN RET P, 2330.00

LOG OF TEST PIT

No. AH-1

jpc

LARKIN CREEK STORMWATER
DETENTION FACILITY
TOWN OF GREECE, NEW YORK

DEPTH(ft) **ELEVATION** 451.0 **DATE** 4/30/75

0

TOPSOIL 1.5 ft.

SM-ML Red-brown, fine to coarse SAND and SILT, trace fine gravel.

Grading to very fine, sandy silt.

Bottom of hole 4.0 ft.

LOG OF TEST PIT

No. AH-2

DEPTH(ft) **ELEVATION** 450.0 **DATE** 4/30/75

0

TOPSOIL 1.2 ft.

ML Gray-brown SILT, trace fine sand, trace clay, moist, slightly plastic.

Bottom of hole 4.0 ft.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

AN RET P, 2330.00

LOG OF TEST PIT No. AH-3

JDC PC

LARKIN CREEK STORMWATER
DETENTION FACILITY
TOWN OF GREECE, NEW YORK

DEPTH(ft) ELEVATION 449.5 DATE 4/30/75

0

TOPSOIL 1.5 ft.

ML Gray-brown SILT, trace fine sand, trace clay, moist, slightly plastic.

SM-SC Gray-brown SILT and CLAY, some fine sand, moist, moderately plastic.

SM Red-brown, silty fine SAND, little fine to coarse gravel, wet, nonplastic.

Bottom of hole 4.0 ft.

LOG OF TEST PIT No. AH-4

DEPTH(ft) ELEVATION 449.0 DATE 4/30/75

0

TOPSOIL 1.5 ft.

SM Red-brown, fine to coarse SAND, trace fine gravel, moist, slightly plastic.

SM Red, silty fine SAND, tracefine gravel, wet, nonplastic.

Bottom of hole 2.5 ft.

The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

AN RET P, 2330.00

LOG OF TEST PIT

No. AH-5

jpc pc

LARKIN CREEK STORMWATER
DETENTION FACILITY
TOWN OF GREECE, NEW YORK

DEPTH(ft) **ELEVATION** 449.0 **DATE** 4/30/75

0 — TOPSOIL 0.8 ft.

SM-SC Gray-brown SILT and CLAY, some fine sand, moist, moderately plastic.

Grading to more sand.

SM Yellow-brown, silty fine SAND, trace clay, wet, slightly plastic.

Bottom of hole 3.5 ft.

LOG OF TEST PIT

No. AH-6

DEPTH(ft) **ELEVATION** 449.0 **DATE** 4/30/75

0 — TOPSOIL 1.5 ft.

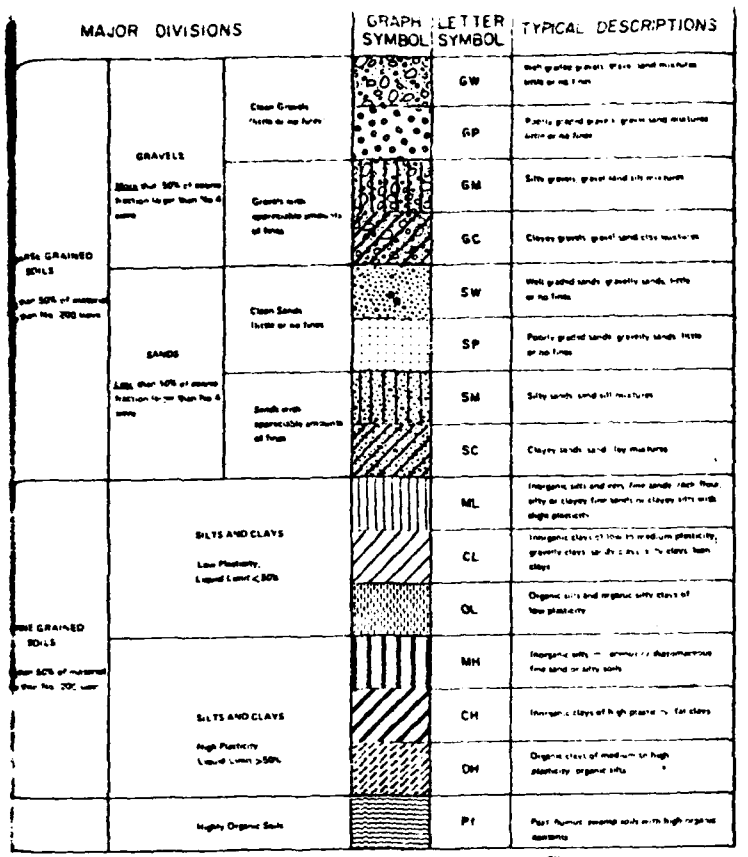
SM Red, silty fine SAND, trace clay, wet, slightly plastic.

Grading to silty, very fine SAND, some medium fine gravel, wet, nonplastic.

Bottom of hole 3.5 ft.

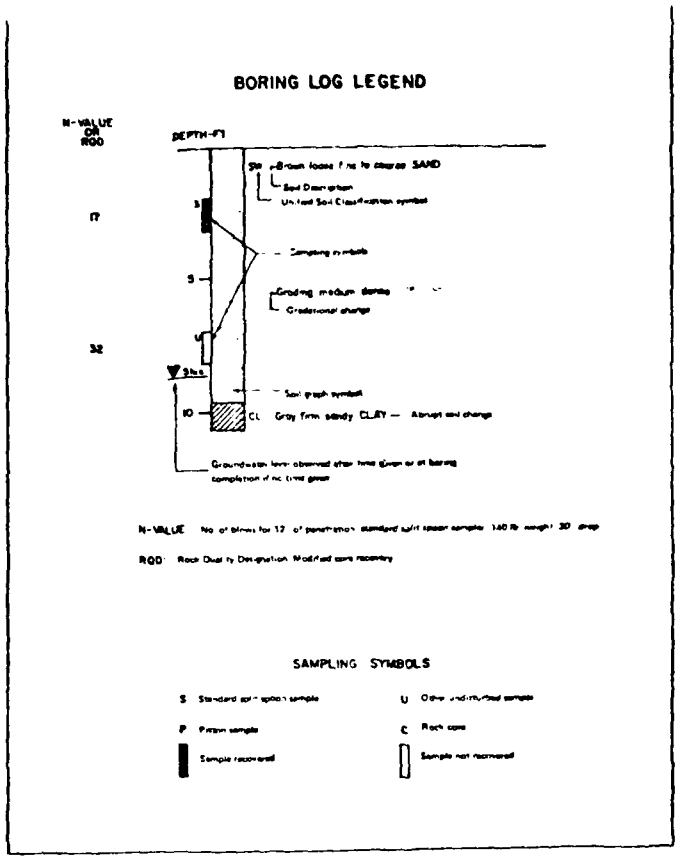
The stratification lines represent the approximate boundary between soil types. The actual transition may be gradual.

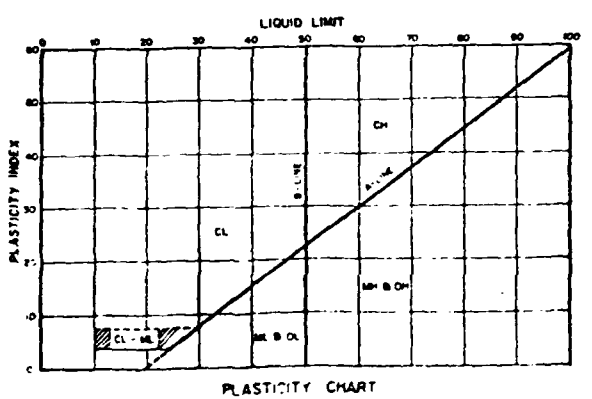
AN RET P. 2330.00



SOIL CLASSIFICATION CHART

(UNIFIED SOIL CLASSIFICATION SYSTEM)





PLASTICITY CHART

KEY TO DENSITY DESCRIPTION, GRANULAR SOILS

N-VALUE	0	5	10	30	50
APPROXIMATE RELATIVE DENSITY, %	0		40	70	90 (100)
DESCRIPTIVE TERM	VERY LOOSE	LOOSE	MEDIUM DENSE	DENSE	VERY DENSE

KEY TO CONSISTENCY DESCRIPTION, COHESIVE SOILS

APPROXIMATE SHEAR STRENGTH, tsf	0	0.25	0.50	1.00	2.00	4.00
DESCRIPTIVE TERM	VERY SOFT	SOFT	FIRM	STIFF	VERY STIFF	HARD

NOTE

TEST HOLE LOG

Hole #1 Station 13+00 Baseline "A" 18' north Elev 443.0

0-1'	topsoil
1'-5½'	reddish brown clay - wet - some sand water seepage at moderate rate at 2'
5½'	sandstone can be broken with shovel

Hole #2 Station 17+00 Baseline "A" 26' north Elev 444.5

0-1'	topsoil
1'-6'	reddish brown clay & sand - wet - banks stable
6'	water entering hole fast rate hardpan - sandstone hard - not easily broken

Hole #3 Station 20+88 Baseline "A" 12' north Elev 458.0

0-8"	topsoil
8"-2'	light brown reddish sand with very little clay
2'-10½'	sand dry no water seepage easy digging solid banks

Hole #4 Station 24+00 Baseline "A" 18' north Elev 467.5

0-1'	topsoil
1'-9½'	reddish-sand-dry-stable banks no seepage into hole - some moisture
9½'-10'	beginning of gravel or broken rock

Hole #5 P.I. 27+13.55 Baseline "A" 17½' west Elev 468.5

0-1½'	topsoil
1½'-7'	dry sandy brown soil - no water seepage
7'-9'	(hard digging) sandstone very hard

Hole #6 Station 30+0 Baseline "A" 12' west Elev 461.5

0-10" topsoil
10"-3' sandy soil brown damp
3'-11' medium reddish brown clay soil-damp
no water seepage, also some small rock fragment
easy digging - banks are stable

Hole #7 Station 34+0 Baseline "A" 15½' west Elev 462.0

0-10" topsoil
10"-2½' sandy reddish loam
2½'-11½' moist sand having some clay
stable banks, no visual seepage of water, easy digging

Hole #8 Station 40+00 Baseline "A" 17½' west Elev 451.5

0-1' topsoil
1'-8' clay reddish moist consistency
8'-11' beginning layer of sandstone - can be broken
water seepage at 8' level

Hole #9 Station 40+00 Baseline "A" 450'± west Elev 453.0
(corner of first hedge now running north-south)

0-1' topsoil - black
1'-2½' moist brown reddish sand
2½'-4½' gravel layer moderate to excessive seepage of water
at this level
4½'-11' clay - gravely sand loam - moisture wet

Hole #10 Station 42+00 445' west 58' south section running west
Elev 455.0

0-1' topsoil
1'-11' moist clay - solid banks - no water seepage, easy digging.

Hole #11 Station 46+00 198' west & 10' south Elev 453.0

0-10" topsoil
10"-9½' hard clay, very hard banks, no water seepage, very dry

Hole #12 Station 1+51 Baseline "B" going north Elev 438.5

0-10" topsoil
10"-6½' moist clay brown loam solid banks dry - no water seepage

Hole #13 Station 5+42 Baseline "B" going north Elev 436.5

0-10" topsoil
10"-5½' red sandstone (very hard) and some sand, little clay can break with shovel. Top of hardpan starts at 5½' slight water seepage noticable.

Hole #14 Station 5+59 Baseline "D" going north Elev 440.0

0-8" topsoil
8"-1½' sandy loam
1½'-8½' small amount of clay - reddish sandstone in horizontal layers very hard - not easily excavated top of hardpan at 8½' - moderate water seepage at 8½'

Hole #15 Station 3+52 Baseline "D" going north Elev 439.0

0-8" topsoil
8"-8½' hard reddish sandstone with sand in horizontal layers - hard going for tractor backhoe
8½' moderate water seepage - moist to wet earth

Hole #16 Station 1+49 Baseline "D" going north Elev 439.0

0-8"	topsoil
8"-9½'	mixture of sand, clay, and sandstone rock fragments moist, easy digging

Hole #17 Station 0+50 Baseline "F" going north Elev 445.0

0-8"	topsoil
8"-8'	mostly sand small fragments of reddish sandstone
8'	water seepage top of hardpan found at depth of 8'

Hole #18 Station 6+0 Baseline "E" going west 70' Elev 439.0

0-8"	topsoil
8"-2½'	solid rock - sandstone

Hole #19 Station 5+47 Baseline "E" going north Elev 441.0

0-10"	topsoil
10"-6'	very hard digging - dry sandy loam and reddish sandstone
6'	depth of hardpan

TOWN of GREECE

2505 RIDGE ROAD WEST
ROCHESTER, NEW YORK, 14626 • 716-225-2000

March 23, 1981

F.W. Byszewski, P.E.,L.S.
Stetson-Dale
185 Genesee Street
Utica, New York 13501

ATTN: Jerry Gomez

RE: Corps of Engineers
Dam Safety Inspections

Gentlemen:

Enclosed, per your request, please find the following information pertaining to the operation, maintenance and performance of two manually-controlled stormwater detention basins located in the Town of Greece:

1) Peak stage elevations and date of occurence
2) Sample copies of operation records
3) Buck Pond Detailed Drainage Study, Page 83

We are presently revising our Stage-Storage Curve for the Deschel Drive basin to correct the drafting errors which you brought to our attention.

We were unsuccessful in obtaining photographs of either detention basin in a partially-filled condition this spring.

Please contact me if you have additional questions or comments on this matter.

Very truly yours,

James S. Peet

James S. Peet, P.E.
Town Engineer

Encl.

Peak Stage Elevations at Larkin Creek Detention Basin
(St. Andrews Drive)

Date	Time	Stage (USGS Elev.)	Control Gate Opening
10-10-77	2:45 P.M.	452.0±	0.5' opened to 0.58'
12-26-79	1:00 P.M.	453.2	0.8' closed to 0.6'
12-27-79	10:30 A.M.	450.0	0.6' opened to 0.8'
2-11-81	3:50 P.M.	450.5	0.75' unchanged
2-17-81	11:00 A.M.	451.2	0.75' unchanged
2-20-81	12:10 P.M.	452.2	0.75' unchanged
2-21-81	11:30 A.M.	453.35	0.75' unchanged

Note: Gage Post Installed and Marked in January, 1979.
Service spillway is 36" dia. RCP with manually operated sluice gate.

ST. ANDREWS DRIVE DETENTION BASIN
INSPECTION
CHECK LIST

DATE: 3/9/81

TIME: 3:30

INSPECTED BY: B. Johnson

ITEMS TO BE CHECKED

1) **GATE AT ST. ANDREWS DRIVE:**

OK

2) **GATE AND LOCK AT CONTROL STRUCTURE:**

OK

3) **OPENING HEIGHT OF CONTROL GATE:**

EXISTING HEIGHT:	CHANGED TO:
2.5'	

4) **COMMENTS:**

8/18/77

ST. ANDREWS DRIVE DETENTION BASIN
INSPECTION
CHECK LIST

DATE: 3/16/81

TIME: 2:30

INSPECTED BY: B. Yahnke

ITEMS TO BE CHECKED

1) **GATE AT ST. ANDREWS DRIVE:**

O.K

2) **GATE AND LOCK AT CONTROL STRUCTURE:**

O.K

3) **OPENING HEIGHT OF CONTROL GATE:**

EXISTING HEIGHT:	CHANGED TO:
0.75'	

4) **COMMENTS:**

8/18/77

ST. ANDREWS DRIVE DETENTION BASIN
INSPECTION
CHECK LIST

DATE: 11/18/80

TIME: 11:45

INSPECTED BY: B.J.

ITEMS TO BE CHECKED

1) GATE AT ST. ANDREWS DRIVE:

O.K.

2) GATE AND LOCK AT CONTROL STRUCTURE:

O.K

3) OPENING HEIGHT OF CONTROL GATE:

EXISTING HEIGHT:	CHANGED TO:
0.75'	

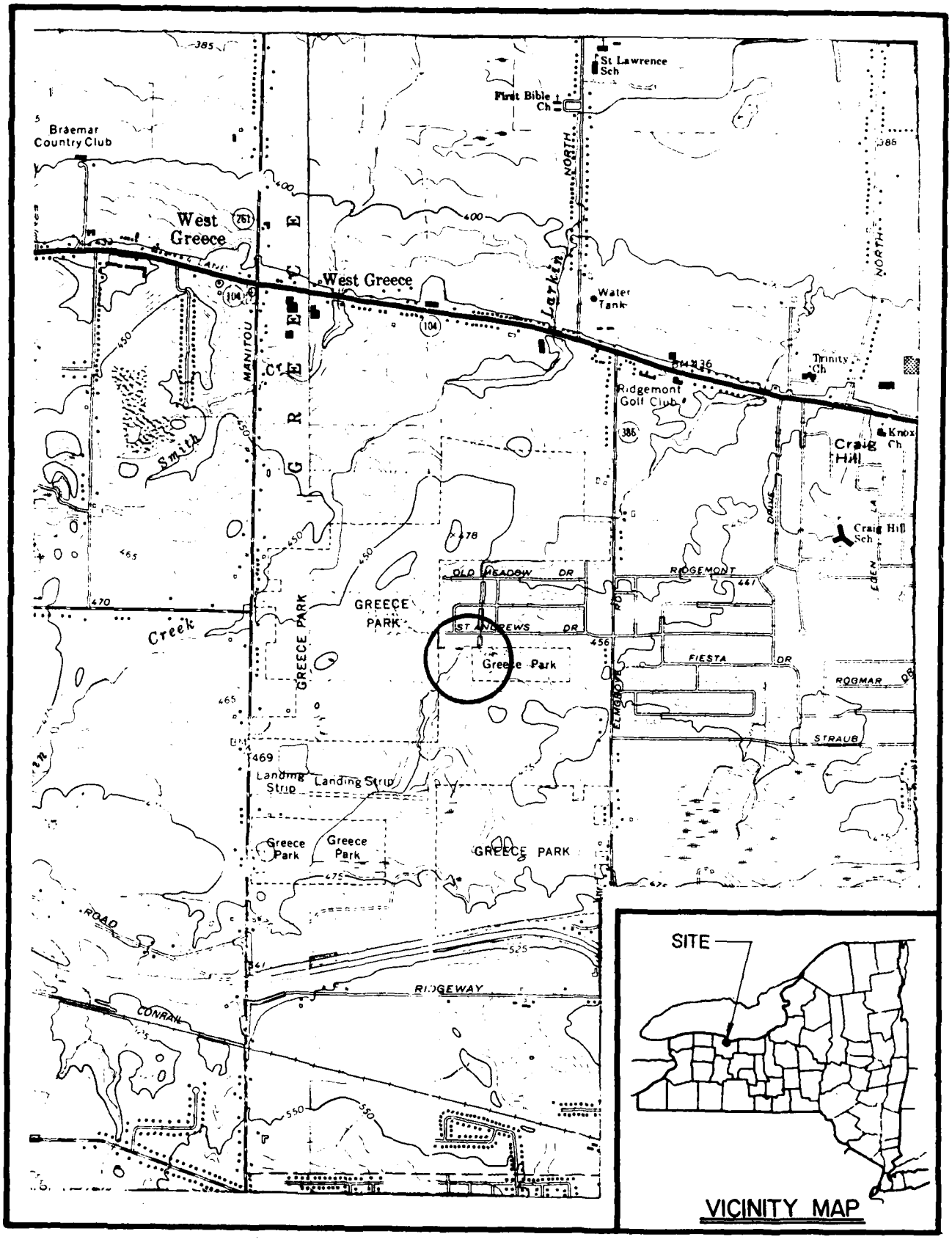
4) COMMENTS:

Slight vibration when control arm is lowered. No serious problems.

8/18/77

APPENDIX F

DRAWINGS



LOCATION PLAN

SCALE 1:2000

FIGURE 1

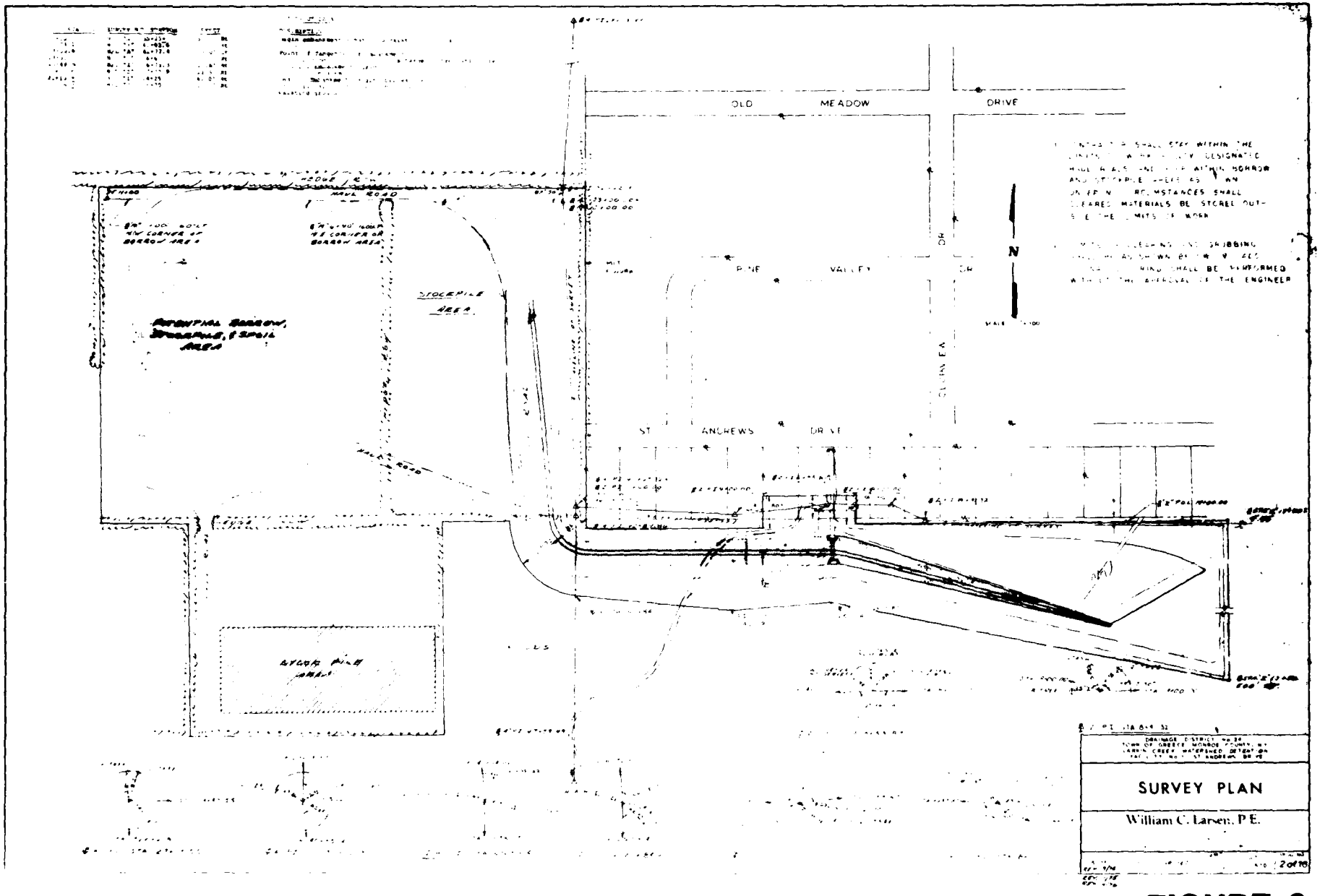

OLD MEADOW DRIVE
PINE VALLEY DR
ST ANDREWS DRIVE
HAUL ROAD
POTENTIAL BORROW, STOCKPILE, & SPOIL AREA
STOCKPILE AREA
BORROW AREA
SURVEY PLAN
William C. Larsen, P.E.

FIGURE 2

AD-A105 989 STETSON-DALE UTICA NY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. LARKIN CREEK DAM (INVENTORY NUMBER--ETC(U)
JUN 81 J B STETSON DACW51-81-C-0009
UNCLASSIFIED NL

3 OF 3
AD A
105 989

END
DATE FILMED
11-81
DTIC

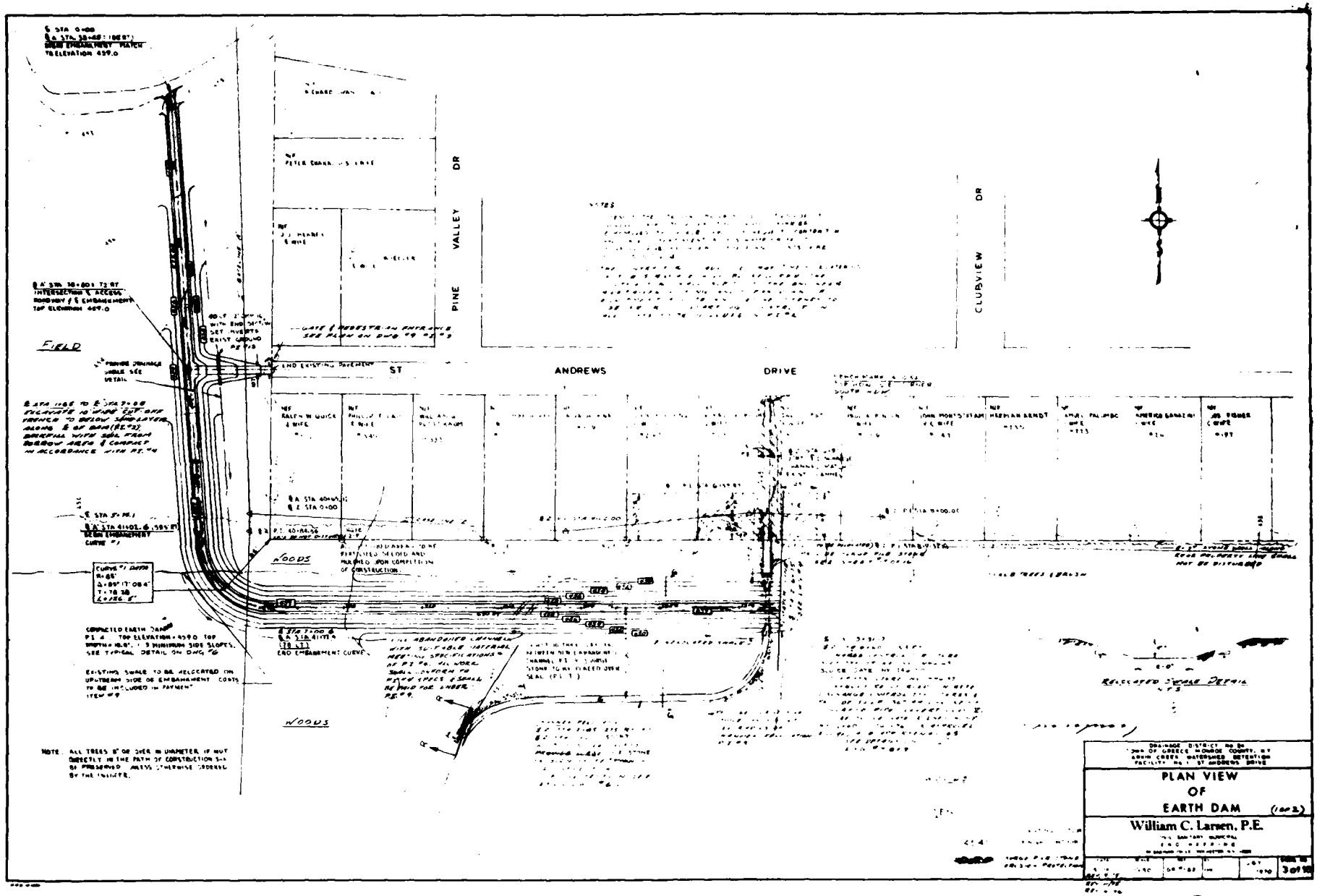

PINE VALLEY DR
CLUBVIEW DR
ST ANDREWS DRIVE
FIELD
WOODS
WOODS
PLAN VIEW
OF
EARTH DAM
William C. Larsen, P.E.
3 of 10

FIGURE 3

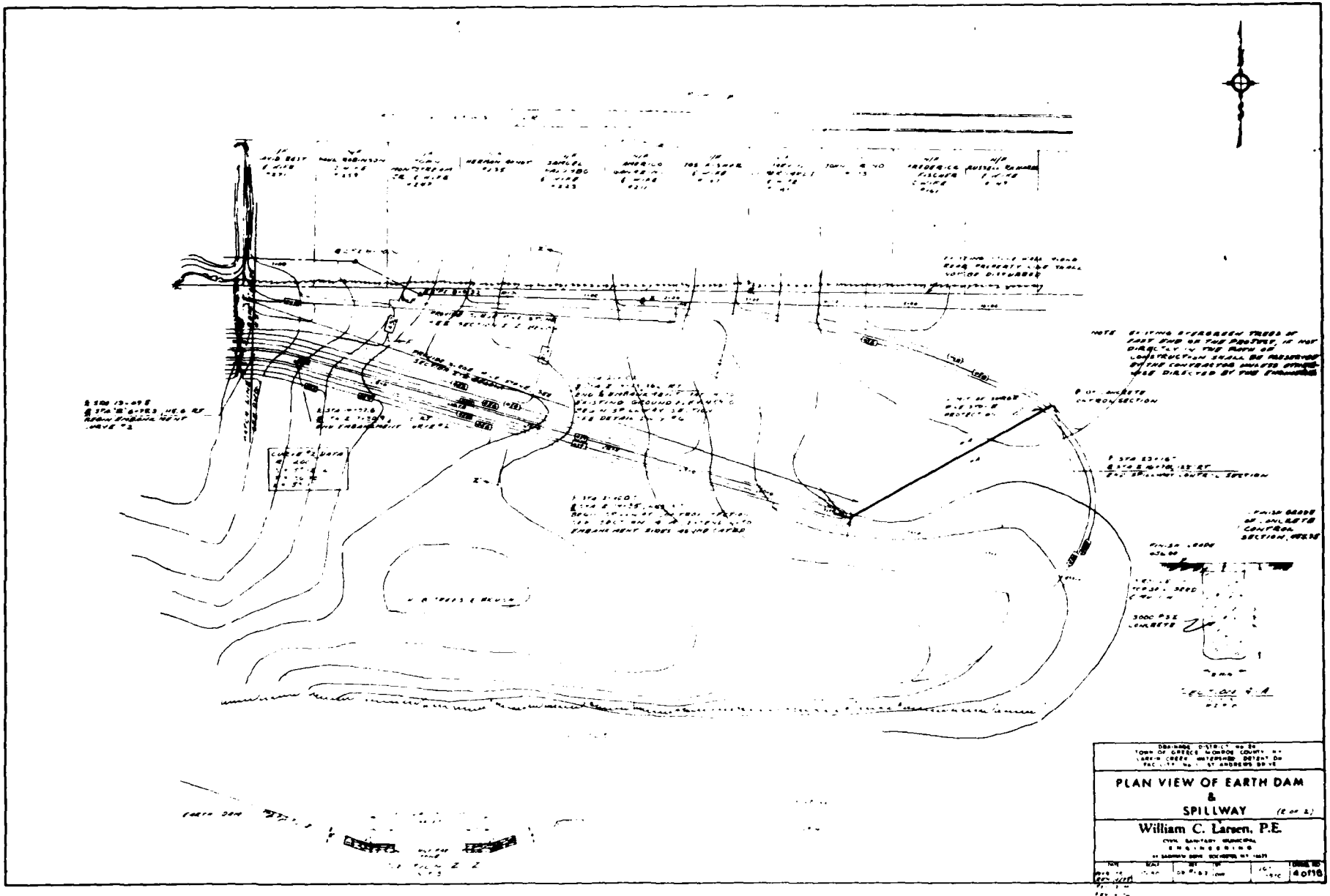

PLAN VIEW OF EARTH DAM
&
SPILLWAY (1 of 2)
William C. Larsen, P.E.
4-0116

FIGURE 4

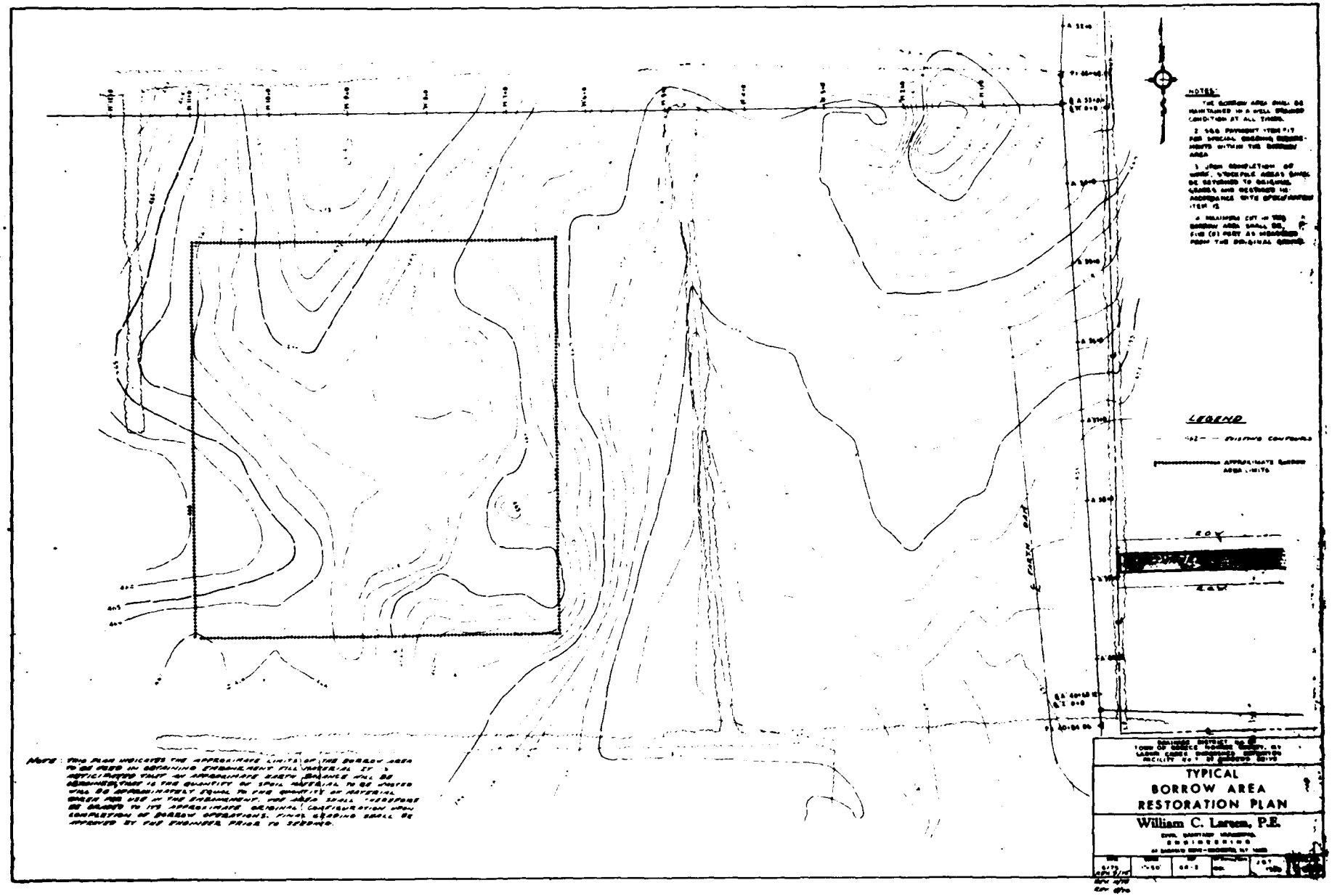
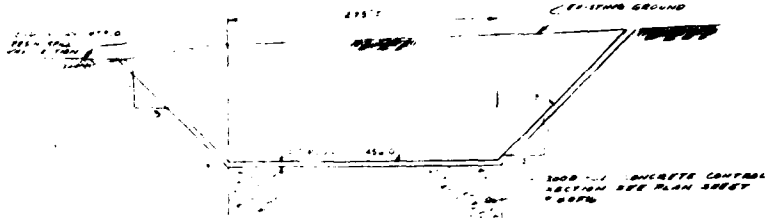
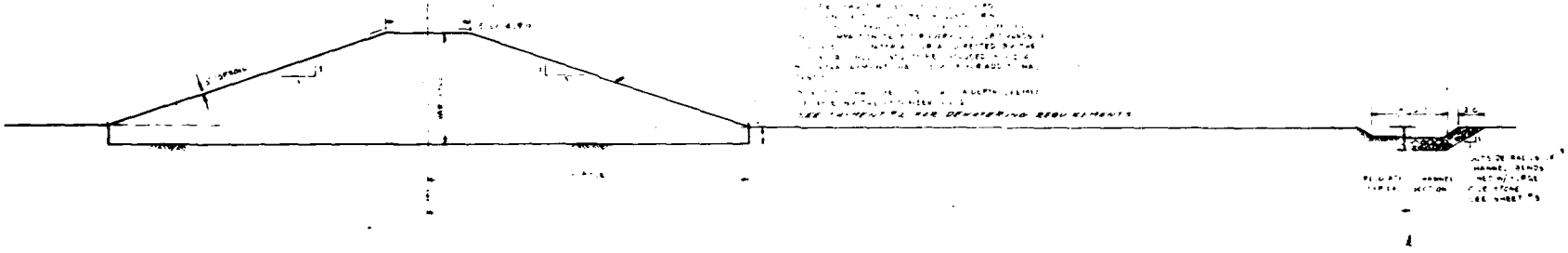

NOTES:
LEGEND
TYPICAL
BORROW AREA
RESTORATION PLAN
William C. Larsen, P.E.

FIGURE 5

CLAY SEAL SECTION R-R



AUXILIARY SPILLWAY OUTLET



TYPICAL EARTH DAM
SECTION G-G

TYPICAL DAM SECTION

William C. Larsen, P.E.

6 of 10

FIGURE 6

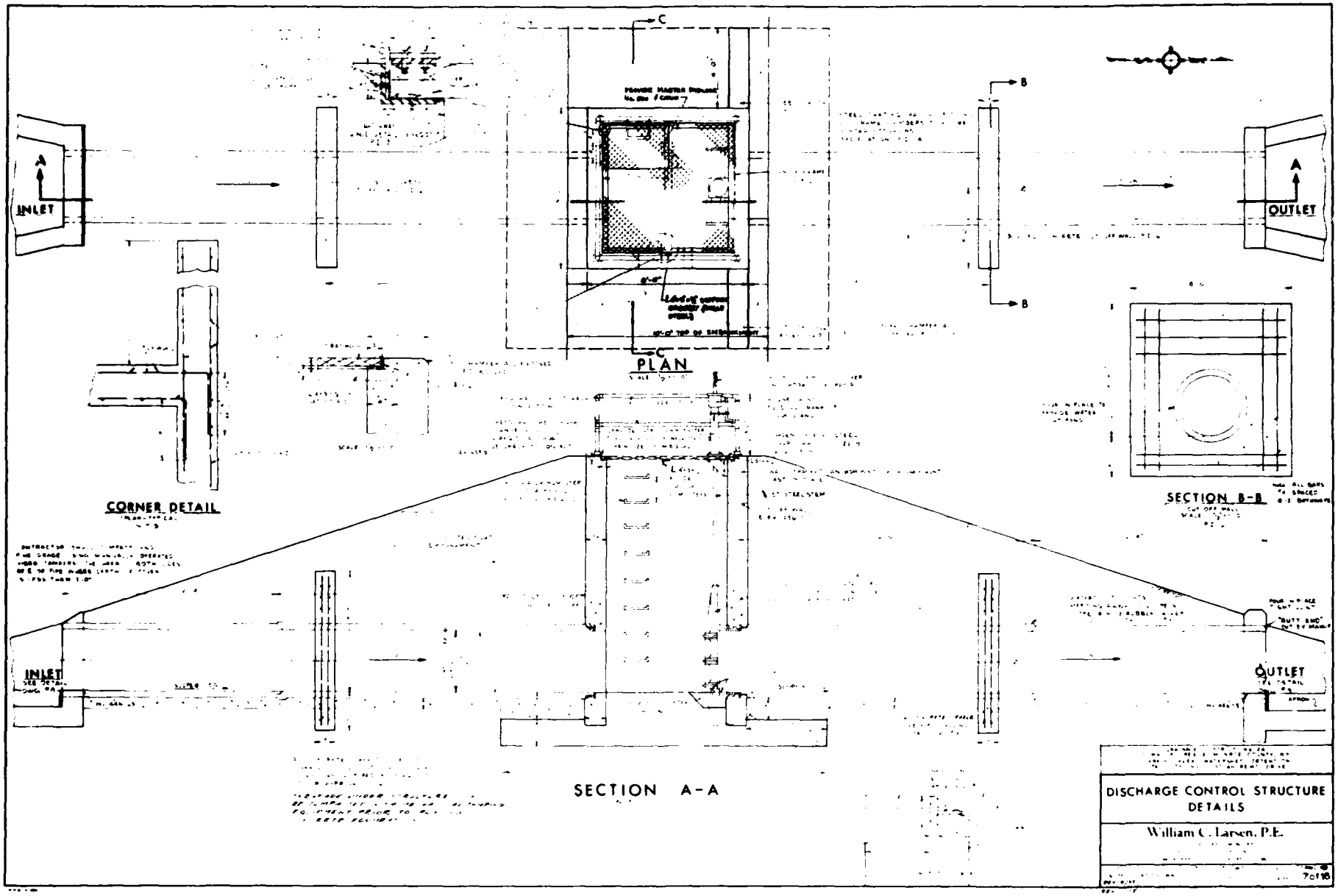

INLET
A
PLAN
C
B
OUTLET
CORNER DETAIL
SECTION B-B
INLET
OUTLET
SECTION A-A
DISCHARGE CONTROL STRUCTURE DETAILS
William C. Larsen, P.E.

FIGURE 7

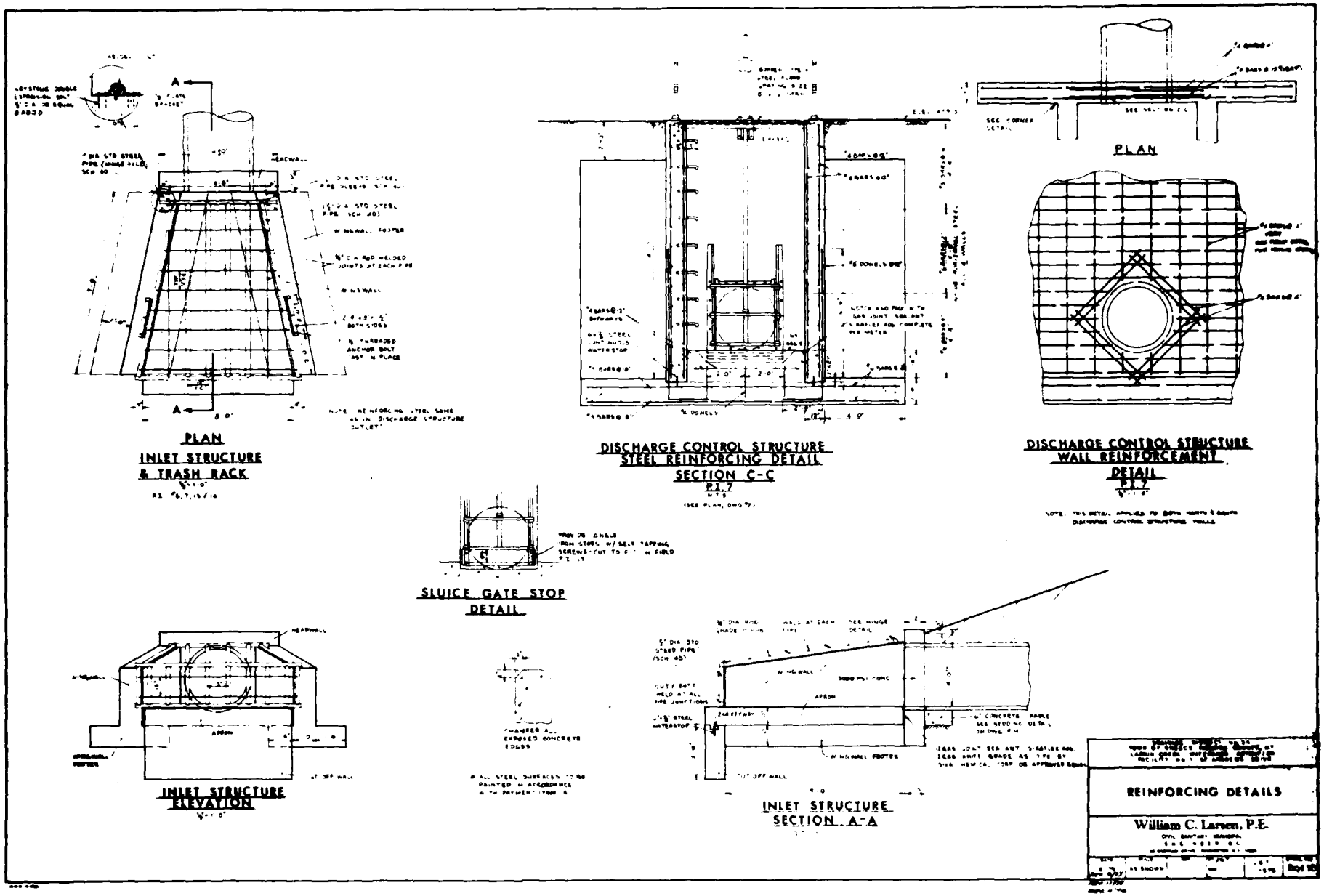

PLAN
INLET STRUCTURE
& TRASH RACK
DISCHARGE CONTROL STRUCTURE
STEEL REINFORCING DETAIL
SECTION C-C
DISCHARGE CONTROL STRUCTURE
WALL REINFORCEMENT
DETAIL
PLAN
SLUICE GATE STOP
DETAIL
INLET STRUCTURE
ELEVATION
INLET STRUCTURE
SECTION A-A
REINFORCING DETAILS
William C. Larsen, P.E.

FIGURE 8

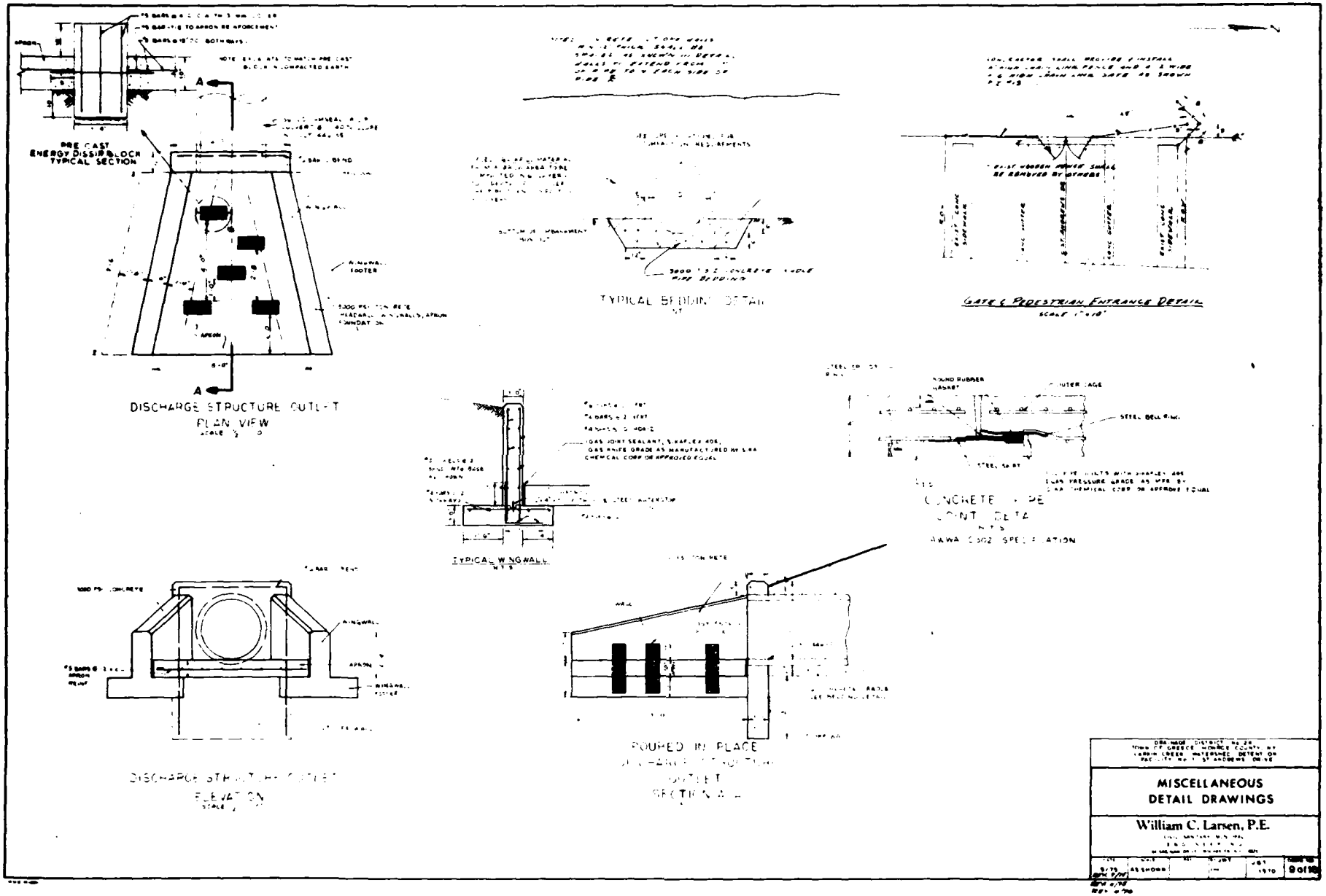

PRE CAST
ENERGY DISSIPATOR
TYPICAL SECTION
DISCHARGE STRUCTURE OUTLET
PLAN VIEW
TYPICAL BEDDING DETAIL
GATE & PEDESTRIAN ENTRANCE DETAIL
TYPICAL WINGWALL
CONCRETE PIPE
JOINT DETAIL
AWWA C302 SPECIFICATION
DISCHARGE STRUCTURE OUTLET
ELEVATION
POURED IN PLACE
OUTLET
SECTION A-A
DRAINAGE DISTRICT NO. 24
TOWN OF GREECE MONROE COUNTY, NY
LARKIN CREEK MAINTENANCE DETAIL OF
FACILITY NO. 1 ST ANDREWS DRIVE
MISCELLANEOUS
DETAIL DRAWINGS
William C. Larsen, P.E.
1970
9 of 10

FIGURE 9


DATE
ILME